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MEDICAL SIDE OF FIELD WORK

By
WM. MUHLBERG, M. D.

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PERFACE

LIFE underwriters frequently criticise medical directors for a lack of sympathy of the difficulties encountered by the men in the field. Medical directors feel that agents do not make a proper effort or exercise a reasonable care in the selection of their prospects. This misunderstanding is really the result of a disinclination to study each others' problems. It is really not necessary for either to have a wide personal experience of the operations of the other, but I do believe that medical directors should keep in touch with the agents' problems through the medium of good journals, conventions, personal interviews, etc. These chapters are written principally to give the agents some idea of the medical directors' difficulties—incidentally therein may be found some hints of value in promoting cooperation. There will, of course, always be controversies, and there always ought to be for the sake of progress. This can be reduced to a minimum, provided both sides view each others' efforts with greater sympathy and a clearer understanding.

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80127

CHAPTER I

MORTALITY AND SELECTION

THE theory of life insurance is based on the assumption that a definite mortality rate prevails among large groups of persons. Several tables have been constructed indicating the deaths that may be expected at every age. The various tables, while not in strict harmony, are nevertheless in sufficient concordance to demonstrate the soundness of the theory.

All calculations with reference to insurance cost are based thereon, and it is the constant endeavor of the medical department to keep well within the limits set by these statistics.

From the medical insurance standpoint, large groups of individuals may be classified under three headings:

1. Persons chosen at random or in large groups without medical examination and without individual self-selection.
2. Self-selected persons, desiring insurance or annuities, but without medical examination.
3. Medically-selected persons.

Definitions

Before entering into a discussion of the relative status of these groups from the medical standpoint, it may be well to preface any remark by giving a definition of the terms used, especially since it is of paramount importance to keep the differentiation in mind in analyzing the resultant mortality of the groups.

By self-selected persons are meant those who seek insurance or annuities volitionally. While a large percentage of these persons would do so for the legitimate purposes contemplated by insurance companies, a certain number would be impelled thereto through the belief that their expectancy of life is less than the average and that therefore life insurance offers the best speculative investment for big returns.

This is a most potent factor influencing the mortality among this class, as evidenced by the almost constant lower death rate among annuitants, who are self-selected without

examination, in contrast with those who apply for life insurance, rigidly medically selected. While it is an aphorism in medicine that the neurasthenics and hysterics who constantly live in the fear of death, never or seldom die, nevertheless, viewed as a group, persons who know they will be long-lived do, on the average, exceed the expectancy of those who are not so sure, and they know this evidently without medical advice or medical knowledge. Of course many, knowingly of poor vitality and of poor health, would select themselves were the doors of insurance companies opened widely to their requests. By large groups are meant at least one thousand, or preferably even ten thousand. Mortality tables predict, of necessity, by the theory of chances, more accurately the real mortality, the larger the number of risks under observation, for the same reason that while one may flip, tossing a coin, four heads out of five ventures, one is almost certain to turn about 500 heads out of 1,000 chances.

Medically selected persons are those chosen through medical examination and this involves a double operation. The examination and recommendation of the medical examiner who bases his prediction on the risk as an individual and the selection of the medical director, who disregards the individual, as a rule, and chooses from the viewpoint of averages.

Random and Group Selections

There is a difference in picking out prospective insurance policyholders at random and in large groups. A random selection would be one in which every individual in a certain city or state were offered insurance. A group selection on the other hand might confine itself within the radius of a factory, or a mine, or an office force or a single profession.

A random choice is most heterogeneous, while a group selection narrows itself within the range wherein medical selection would come to play, inasmuch as we possess statistics giving an idea of the mortality to be expected among professional men, clerks, mechanics, miners, etc. Taking up then the three classifications, it may be said in the first heading, persons chosen at random or in large groups, would show a mortality closely approximating the mortality tables from the very beginning. There would be among them,

many who have heart or kidney disease, or tuberculosis, some even (depending upon the method employed) who are suffering from acute disease and the mortality from these would of necessity manifest itself practically immediately. The more circumscribed the groups, however, the less would be this tendency, because of necessity, if an insurance company offered to issue policies to one thousand active mechanics, only a few of the actively engaged men would be suffering from any mortal malady. Group insurance is becoming more popular in the underwriting of life insurance and when done, after a thorough investigation of the environments, occupations and other data available without medical examination, it is no doubt profitable. But it must be borne in mind that, while the applicants are chosen without medical examination they are not entirely freed from the scrutiny of medical selection. The advantage to the company of this method of insuring is the saving of the cost of the medical examination, which, in some measure compensates for the earlier and relatively heavier mortality.

Self-Selection

The second heading, namely, self-selected persons desiring insurance or annuities without medical examination, is an interesting one in that it represents the extremes of mortality and illustrates the importance of that illusive factor in medical selection—the intuitive knowledge of the individual concerning his own longevity. No company so far as I know, issues life insurance to risks without examination, the mortality would necessarily be ruinous, but self-selection constantly comes to play in the operation of life insurance policyholders. It is to a minor degree a self-selected individual who renews or converts his term policy at the time the privilege of conversion arrives, it is the self-selected person who lapses or continues his policy annually, it is the self-selected person, who chooses extended rather than paid-up insurance when the policy lapses. That these influences are not impotent is seen in the risking mortality experiences of fraternal organizations, who issue practically only renewable term policies. On the other hand, self-selected persons who apply for annuities, where medical examination of course is not required or even desired, show almost uniformly a mortality, especially among elderly women, so

low as to be the despair of the medical director and the financial loss of the company.

Medical Selection

Finally, we reach the heading of the medically selected individuals, who constitute by far the largest percentage of insurance policyholders. As you know, perhaps often to your sorrow, the ordeal is a trying one to the applicant, to the agent and to the company. There are several elements that are conducive to satisfactory results. The examination must be made by a skillful physician, who knows what is important, what is unimportant, who has tact that enables him to perform his duty not only to the company but also to the agent and to the applicant, and who possesses the instinct that helps ferret out the dishonest or speculative risk. The task is not an easy one, and by no means the least asset of an insurance company is a corps of efficient, honest medical examiners.

But, as I stated before, the medical examiner views the matter of desirability of the risk as an individual. It is the medical director who must choose from the more distant and therefore comprehensive viewpoint of averages and groups, and therein has his work become practically a specialty.

CHAPTER II

AGENT AN IMPORTANT FACTOR

A POWERFUL influence in achieving desirable results—and the medical director does not withhold his recognition of the valuable service—is the aid of the honest insurance agent. It may be stated, almost as an axiom, that the more desirable the risk, the greater the reluctance to assume insurance, and it is only through the strenuous efforts of the agents that the gilt-edged class of applicants are literally coerced into taking insurance. This factor is as surely conducive of favorable mortality as is the antithesis that self-selected risks experience an unfavorable death rate. The influence of these elements will vary necessarily, depending on the efficiency of the medical examination, the rigidity or laxity of the medical director and the character of the agency force, but the tendency is usually the same—the death rate is generally very favorable for a period of three or five years and then tends to approximate that expected in the mortality tables, which are based on the experience of insured lives excluding the first few years of insurance, thereby giving the ultimate rate of mortality. In fact, it is often stated that medical selection protects for only an average of five years—that after this period, the results are no better than that from group insurance. This assertion, I believe, is gradually losing its force, from the fact that a more exact knowledge of medical selection is gradually projecting to greater distances the prognostic vision of the medical director—but the fact that fewer die in the earlier insurance years will, perhaps, always be true.

Let us now consider the material with which the medical director of an insurance company works and with which he hopes to produce a satisfactory product.

The medical examination itself can be divided conveniently into three parts. It might be well to review in brief the more salient feature of each division.

The Application

Part one is the application proper, in which the prospective policyholder gives his full name and address and all former residences, states the form and amount of insurance desired, the premium he expects to pay, his occupation, past and present, with full particulars, his employer's name and address, his age, date of birth, place of birth, beneficiary and the relationship of beneficiary, the amount and plans and dates of other insurance carried in the same or in other companies, his experience with other companies as to whether he has been declined, limited, postponed or treated as sub-standard risk and the reason for such adverse action. Frequently non-medical questions, such as a contemplated change in occupation or residence, or hazardous pastimes, such as automobile racing or aerial ascensions, are inquired into. A statement is often requested as to form of settlement made, whether by cash or by note. Where the beneficiary named is not closely related and dependent a full explanation of the insurable interest is asked. This application blank, which is often on a sheet of paper separate from Parts two and three, is filled out by the applicant, signed by him and the signature is witnessed by the agent. The medical examiner is usually permitted to read these statements before making the examination.

Part Two of the application deals principally with the past medical and present family history of the applicant. It comprises a series of carefully worded questions for whose proper answer the advice or assistance of the medical examiner is necessary. The applicant is asked whether he believes himself to be in sound health. Previous diseases are carefully inquired into and usually a list of the more important or commoner affections are given, so as to assist the applicant's memory. A special description with full particulars is required of those occurring in the past five or ten years. Pathological conditions which are of especial significance from the insurance standpoint are generally signified by being placed under separate headings. Thus any impairments of vision, of hearing, of discharges from the ears, of previous surgical operations, of exposure to tubercular infection, or of occurrence of insanity in family history are prominently brought to the applicant's attention.

The habits of the applicant with regard to the use of narcotics and the daily consumption of alcoholic liquors are noted with especial reference to occasional or continual over-indulgence in intoxicants in the present or in the past.

An important section of this part is the record of the family history. A statement is required of the ages and condition of health of the parents, brothers, sisters and grandparents, if living; if dead, the cause of death, age at death, condition of health preceding the fatal illness, whether or not tuberculosis or other constitutional diseases were suspected and date of death are noted. Necessarily the medical examiner assists greatly in filling out the section on family history by his ability to diagnose the probable cause of illness or death from the description of symptoms given by the applicant. Part two is signed by the applicant and witnessed by the examiner.

The third part of the application for insurance comprises principally the objective findings of the medical examiner as the result of a thorough physical examination. The general appearance, race, sex and probable age are asked; also the exact height in shoes and the precise weight in ordinary clothing on accurate scales, with a discussion of any recent marked changes in weight.

Then there follows a series of medical questions, designed to bring out results of a thorough examination of the heart, the arteries, the pulse, the pulse-rate, the lungs, the respiration, the circumference of the chest at forced inspiration and expiration, the girth of the abdomen, and the condition of the abdominal organs. In order that the medical examiner may not neglect any point of consequence, the question respecting each item is asked separately and requires a separate answer or description. The eyes, ears and certain tendon reflexes are tested to detect the possible presence of nerve disease. The temperature of applicant and his blood pressure are recorded. A urinalysis is necessary in every case and this includes an examination for albumen, sugar, specific gravity and chemical reaction. A general survey is then made by the examiner to discover the presence of any tumors, ulcers, skin eruptions, hernias, etc., also to disclose any evidence of past bad habits with reference to alcohol or narcotics. In women, questions are asked regarding affections peculiar to the sex. If married, a complete maternity

history of any children born, and the complications attending the births are necessary. Many companies insist on knowing whether the husband carries insurance and why the wife applies for insurance.

The examination ends with a query whether the examiner believes the applicant to be a safe risk for insurance. Part third is ordinarily signed only by the medical examiner, who at the same time, gives the date of the examination, the date of his graduation from medical college and the name and character of his medical school.

Where large amounts of insurance are applied for, it is customary to have two physicians perform the examination. At the same time, a sample of urine for microscopical examination and for more elaborate chemical analysis is sent to the home office of the company.

It is usual for the examiner after completing his work, to send part two and three to the agent, who checks it up for omitted answers and then forwards it to the home office of the company for final disposition. The objection to this plan is obvious in that it occasionally gives the agent opportunities of learning facts from the application which the examiner intended only for the eyes of the medical director. Many companies, therefore, adopt the plan of having the blanks sent directly to them without the intervention of the agent.

CHAPTER III

METHODS USED IN MEDICAL SELECTION

THE medical director, judging the acceptability of the applicant, relies of course on the data submitted in the application, in any special reports, from the examiner, or from applicant's family physician, from information received from other sources such as credit or rating companies and from special correspondence with other insurance companies concerning their actions on previous applications to them by the same risk. This evidence must be carefully weighed and if the balance turns against the advisability of issuing the insurance applied for, it is often possible by reducing the amount or modifying the plan or by other means to be discussed later, to reach some compromise satisfactory to the applicant and to the company. In reaching this conclusion, the medical director draws principally on two sources of knowledge:

1. His general knowledge of medicine, acquired through his medical training or clinical experience.

2. The actual experience of insurance companies with respect to certain risks exhibiting definite impairments—this is known on account of the assistance given him by the Actuaries in acquiring it, the medico-actuarial experience.

In the earlier days of insurance, the medical director had to rely entirely on his own knowledge, eked out by such powers of intuition or foresight as was vouchsafed him by a kind Providence. And although this is viewed at the present time as inaccurate and unscientific, I sometimes marvel at the truly wonderful insight that the earlier medical directors displayed. As a rule, they guessed right and our more painstaking actuarial work has merely corroborated the wisdom of their judgment. Where, in a few instances, they made blunders, the inadequacy might in nearly every instance be ascribed to the deficiencies and inaccuracies of medical science itself. The problems are not easy. In private practice, the physician is content to look ahead a few months or perhaps a very few years. He feels satis-

fied if his prognosis is verified in perhaps half of his cases and prognosis is after all the most difficult act in medicine. In his capacity as medical director, however, he could not afford a margin of fifty percent of mistakes and his prognostic vision had to extend over twenty to thirty years, instead of an equal number of months. Necessarily, much conservatism was displayed and it is the constant effort of his successors to grow more liberal, so that more and more of the community may enjoy the benefits of insurance. Let me illustrate this by a single example. A physician is called in to attend a patient suffering from renal colic. The doctor is of course beset with inquiries by every one interested in the probable outcome. The diagnosis is made, the age, etc., of the patient and the severity of the attack are noted, as well as the potency or efficacy of the treatment and after weighing all elements carefully the physician announces that the patient will recover or die, as the case may be. But the medical director must forsee complications and sequela that may occur years after, other diseases following in the train of this attack, other conditions arising as a side issue from the fundamental cause of the renal colic itself. Actually, as I shall show later on, renal colic occurring at the older ages, shortens life through diseases of the heart and blood vessels. These organs during the attack itself may appear perfectly normal.

Medico-Actuarial Investigation

Gradually, and perhaps some day completely, this method will be replaced by the more exact knowledge gathered through the researches of medico-actuarial experience. It may be well to review in brief the methods and objects of this investigation. Theoretically, at least, every applicant for insurance has a different medical insurance value. Some risks give an absolutely clear personal record, a family history that shows great longevity, a favorable occupation and an environment and insurable interest that are above criticism. No doubt, the mortality of such a group is very low, but no company could afford to select only applicants of this type for its policyholders—the high rate of declinations would disrupt any agency force. The medical director, therefore, is constantly recommending to his company persons with slight impairments or flaws in their per-

sonal, family or occupational histories. It is the endeavor of the medico-actuarial investigation to point out the dangers in one direction and the safe limits in another. For this purpose, and I will make the description as brief as possible, the leading facts concerning every applicant for insurance are transferred to a card, divided into columns containing numbers, each number representing certain data necessary for the investigation—thus the age, occupation, certain phases in family history, habits, height and weight, the commoner diseases, etc., are assigned special places and are represented by holes punched through the card.

The labor entailed in the preparation of this material is necessarily enormous, but after the cards are prepared, their separation for the study of any particular impairment becomes comparatively simple. Thus, if it is desired to study, let us say the mortality of syphilis, the cards are placed in a separating machine which by the arrangement of an electric wire brush, picks out all cards punched positively for syphilis. A reassortment may then be made for ages, etc., and the mortality studied year by year. To make the study as homogeneous as possible, the final assortment may be made so as to include only applicants who are gilt-edge except for the single impairment of syphilis, thus eliminating the disturbing influence of under or overweight, alcoholism, etc. The final results are cast up in actuarial tables showing the deaths that occur actually to the deaths expected by one of the standard mortality tables. These statistics enable the medical director to decline, limit or approve an impaired risk with the same degree of confidence that he feels in handling an unimpaired one.

As a concrete example of an actual study permit me to cite the investigation of Dr. Brandreth Symonds, entitled, "A Statistical Study of Renal Colic and Hepatic Colic." Out of 1,742 entrants giving a history of renal colic, 290 doubtful cases were eliminated, leaving 1,452 who gave a distinct history of this impairment. The material, however, was not homogeneous in respect to physique, residence, etc. Overweights, those residing in foreign countries or in the southern states and those having more than one attack were excluded. This left a group of 892 lives practically homogeneous and without impairments other than the record of a single attack of renal calculus.

The policyholders were now studied in various ways to determine the mortality among them at different ages, at different years after the history of the attack, at different periods of insurance in force, etc. A single table will illustrate one of this series of studies.

Mortality Grouped into Decades

Age.	Actual No. of deaths occurring.	No. of deaths expected.	Percent.
30-39	20	25	80%
40-49	23	19.4	118%
50-59	11	8	137%

It will be noted from this table that persons who give a history of one attack of renal colic but who are otherwise apparently first class risks have a low mortality (80 percent of the expected) at ages 30 to 39; the mortality (118 percent) is unfavorable at ages 40 to 49 and it is very high (137 percent) at ages 50 to 59. As has been previously stated, the existence of two or more impairments has a tendency vastly to complicate the problems, inasmuch as several impairments may not be viewed as affecting the risk in an arithmetical sense. Occasionally, one defect will greatly exaggerate the risk imposed by a second. Thus in a young man with a history of hemorrhage from the lungs, the existence of light weight is a most serious handicap; on the other hand, one impairment may almost destroy the effect of another—the existence of heavy weight has a tendency to neutralize the history of blood-spitting in a young applicant. Companies that do not issue sub-standard insurance, will ordinarily accept risks presenting impairments that in the judgment of the medical director are not sufficiently serious to cause a mortality rate materially above the average rate of the company.

CHAPTER IV

SELECTION OF RISKS

APPLICANTS who are over weight or under weight are ordinarily accepted provided the variation does not exceed 15 percent or 20 percent. Since it is the experience of companies that persons who are under weight enjoy a more favorable mortality with advancing years, the medical director rules less rigorously with lean applicants of advanced years. As a rule a man 25 percent under weight will be accepted at the age of 50. Contrariwise, however, is the experience with heavy weights. Advancing years makes them less desirable and in consequence the medical department either rejects outright heavy elderly persons or if middle-aged, offers them some form of endowment insurance that will terminate before the period of heavy mortality manifests itself. Some impairments are of significance for only a short period of time. Thus rheumatism is a most serious defect if one attack has occurred in the past year or if two attacks have taken place in the preceding five years. This is owing to the tendency of rheumatism to produce valvular disease of the heart, which frequently does not progress sufficiently for detection by the medical examiner for a period of a year. These applicants are, therefore, declined until a year has elapsed after a single attack or until five years have supervened after two attacks.

Certain other impairments are constant and non-varying. A railroad fireman, who is otherwise first class, remains constantly an undesirable risk at ordinary rates so long as he pursues his occupation. Companies generally meet this form of hazard by charging five to ten dollars extra per thousand per year for the insurance. This is in reality substandard insurance in principle, but most companies who otherwise confine their business to standard policies adopt some schedule of extra rates for hazardous occupations.

It will be seen from the above examples, that every impairment has its own characteristic curve and so long as the medical director confines the risk which the company

assumes to those periods of the curves where it does not soar above the normal line, it is possible for him to keep the mortality experience comfortably within, or considerably below, the normal standard.

May Regulate Mortality.

It will be readily understood from these examples that it is not the endeavor of the medical director to maintain an excessively low mortality rate. Life insurance in its purely business phase must influence the practical workings of medical selection. Any mere tyro with little or no knowledge of the art or science of medicine, might easily keep down the death rate of the average company to perhaps 45 or 50 percent of the expected mortality, but he would drive the agency force from the field through the rigor of his rulings. It is generally conceded that in a company of medium age and of healthy growth, a mortality of from 55 to 70 or even 75 percent is quite satisfactory. Fluctuations of course occur, but most of the active companies of today come within this range. Success in medical selection is demonstrated by maintaining a reasonably low mortality rate with the least possible handicap to the agency force in the field. The bonds of union and cooperation between the medical department and agency staff are growing firmer year by year and this arises from the increased confidence that agents are acquiring that it is the function of the medical director to assist rather than to oppose, to suggest rather than to hinder. In a few companies the tendency towards educating the agent in the field in the fundamental principles of medical selection is growing in favor and it should be further encouraged.

In a statistical study I made of risks declined by the company I represent, I found that almost exactly one half were refused insurance for reasons that the agent might easily have anticipated with the most percursory investigation. It is poor business for an agent to waste his time, an applicant to build false hope and a company to spend its money on prospects that are hopeless from the medical standpoint.

There is no reason why any agent should experience a greater percentage than about 5 percent of declinations if he chooses his prospects with discretion.

It may be well in passing, to indicate the importance of the medical actuarial work from a sociological standpoint. Modern medical science has and is doing splendid work in the conservation of human lives. But unfortunately the benefits have accrued principally to those of younger years. The death rate of infants and young adults is improving greatly as a result of a better understanding of the causes of death and of a more effective application of the laws of hygiene for these ages. But the improvement has originated primarily through the studies of bacteriology and the prevention of bacterial disease. Deaths after the age of 40 are most frequently due to a degenerative type of affection, a breaking down of the heart, kidneys and arteries and other organs and to cancer. Unfortunately bacteriology has been of but scant assistance fighting these affections and the statement is often made that the death rate at present is practically as high often past the age of 40 as it was half a century ago. It is to be hoped that researches of the medico-actuarial investigation will partly blaze the way for a proper guidance for improving this mortality, especially since the causes seem to be connected in some way with our modern mode of living rather than with any true degeneracy of the stock. From an altruistic standpoint, insurance must be as comprehensive as possible if it is going to fulfill its promise of social service and organized beneficence. Perhaps 10 percent of the population are at the present time deprived of its protection on account of poor health. It is impossible under the present method of insurance underwriting to include all, but it is feasible to extend the zone so as to comprehend many who are uninsurable at standard rates.

Sub-Standard Insurance

This brings us to the consideration of sub-standard insurance, which in brief is an endeavor to issue insurance to those who are not eligible at the ordinary rates on account of the existence of impairments that render their mortality excessive. As I stated previously, every applicant has an individual value. So long as the medical director does not place too low an appraisement on it, the risk may be accepted as a policyholder. As a matter of fact, an insurance company accepts quite a few so-called border line cases who in themselves have a rather excessive mortality but

he mixes them in with the gilt-edge applicants so that the resultant mortality remains satisfactory. But a prospect weight is obviously too bad a risk to include even by this method. The sub-standard cases may be handled by one of several methods and I shall merely indicate them so as to give you an idea of the method:

1. Method of additional premiums, whereby there is added to the ordinary premiums a certain extra amount commensurate with the nature of the impairment.

2. Method of advancing the age, whereby the applicant is compelled to pay the ordinary premium not for his own age, but for an applicant five, ten or more years older than himself.

3. Lien method, whereby the standard premium is paid, but a certain deduction in its face value is made. The face value is permitted to increase as the policyholder grows older, until, after a lapse of years, the lien may be automatically removed.

4. Limitation of plan, whereby the risk is offered usually an expensive endowment policy for a limited number of years.

This method is particularly valuable for applicants in whom a high mortality is anticipated only after the expiration of the endowment period. It is the favorite method of handling overweights, but in reality is not sub-standard insurance.

5. Method of special disbursements of dividends, whereby the regular rates are changed by a participating company, but any excess of mortality in sub-standard groups are compensated for by a reduction of the so-called dividends that are returned to the policyholder.

No method is free from criticism, inasmuch as every life has an individual value and theoretically requires a special treatment too complicated for practical handling. Sub-standard insurance is of course a step in the right direction and should be encouraged. There are, however, quite a number of pitfalls and dangers so that the medical selection and the actuarial computations must be made with great skill.

Self-selection manifests itself markedly among members of this class.

A risk, let us assume, is placed on the sub-standard class and his age is advanced, because this year his urine shows albumen. In a year, the condition may clear up, when he may have no difficulty in securing a policy at his actual age in another company, whereupon he lapses his sub-standard insurance. The policyholder, however, whose albuminuria persists, will likely not lapse and the tendency in this group is towards weeding out of the desirable business. This self-selection, must of course, be anticipated in the cost at which the policy is offered and thus a form of insurance, already theoretically expensive becomes even more so practically.

CHAPTER V

MORAL HAZARD

By moral hazard in the broader sense, is meant an effort to secure insurance for the purpose of speculation or through fraud. The question is not a purely medical one, especially where gross fraud is attempted, but it usually devolves on the medical director to sense its existence and if possible to frustrate its commission.

Any classification of the subject is difficult, but in a general way these cases might be divided into several headings.

1. Moral hazard of suicide.

2. Speculation—a—Moral hazard of suppressed information regarding existence of disease—b—Moral hazard of beneficiary.

3. Pure fraud.

A person contemplating suicide is naturally anxious to secure insurance, provided he has an insurable interest. Ethical considerations naturally weigh but little in the minds of these individuals and to defraud an insurance company for the purpose of protecting a wife or children is looked upon by them as a highly commendable and meritorious proceeding. It will be noted that the prospective suicide must have a strong insurable interest before applying to a company. We may leave out the consideration the altruist who hopes to sacrifice himself in order to help financially his pet charity or propaganda. It is the existence of this legitimate need for insurance that makes it all the more difficult to catch these applicants. Most companies protect themeslves by inserting a clause in their policies rendering the contract void if the policyholder commits suicide, whether sane or insane, within a year of its issuance. This is a wise provision, inasmuch as few persons will contemplate the act for twelve months and then commit it. Suicide is usually the result of a sudden acute attack of melancholia, or brainstorm. In very rare instances, suicide may be anticipated

through reports received by the medical department that the applicant has had domestic or financial troubles. These risks are particularly likely to over-insurance, that is, to apply for more insurance than their finances will warrant their carrying.

Speculation

2a. Moral hazard due to suppression of information regarding health. It is not always possible to detect the presence of ill health by means of even a thorough physical examination. The physician relies much on the history given by his patient to arrive at a diagnosis and so likewise does the medical director depend on the occurrence of a previous illness, which may leave no discoverable trace, to fix the value of the applicant from the insurance standpoint. Misrepresentation, therefore, occasionally occurs. Fortunately it requires much technical knowledge on the part of the applicant to perpetrate this fraud, and the dangers, if discovered, are likely to result in disagreeable complications for the policyholder, so that these considerations act as a deterrent to its frequent occurence.

2b. Speculation involving more particularly the assistance of the beneficiary is not uncommon.

Under the heading comes the adult son, who speculates on his father's or mother's life, the corporation that insures a sickly member of the firm, the mistress who is made beneficiary by her associate, or of other persons, without insurable interest on the life of the applicant. In most instances, the beneficiary pays the premium and of course expects soon to realize on his investment. From a social standpoint this hazard is particularly pernicious, because beneficiaries have been known to grow restive through delay and to encourage early returns.

This form is perhaps the easiest to anticipate—the lack of insurable interest in the beneficiary, the element often of over-insurance, and the financial rating of the applicant himself give the necessary warning. Strangely enough, many of these cases develop through the ignorance of the applicant, who, looking upon insurance companies as great charitable institutions, can see no wrong in encouraging the company in the performance of what they conceive to be its principal function.

Pure Fraud

It would tax the imagination of the author of our highly colored detective fiction to parallel the cases of fraud and attempted fraud in insurance history. The commonest practice is the result of collusion among agent, policyholder and examiner. Unless very cleverly conducted, it nearly always fails and fortunately the insurance companies are relentless in prosecuting the conspirators, so that nowadays it is rarely attempted.

It will be seen from the foregoing description of the duties of the medical director that his work is not easy. Acting as it were as a buffer between the agency force and the company, he is compelled to withstand much pressure from both sides. The fact that he must be a physician makes much of his work difficult—because his early training in medicine is along altruistic rather than business lines.

CHAPTER VI

BORDERLINE CASES

A BORDERLINE risk is one whose expected mortality is considerably above that of the average of the Insurance Company. The term must not be confused with substandard. Substandard risks are distinctly less favorable than borderline applicants and are usually declined by companies doing a strictly standard business.

Before discussing the question of borderline cases, it might be well to indicate certain general principles governing the practice of selecting insurance risks.

While the theory of insurance is based on averages, it is a fact that the mortality tables comprise very heterogeneous groups. Some of the tables, in fact, include persons who are not very desirable, and even the select tables comprise policyholders that vary with respect to their desirability.

Theoretically, every applicant has an individual value, the appraisement of which depends upon numerous factors, and were it practicable from the actuarial standpoint to do so, every premium would differ in accordance with this value. Companies that do a standard business charge the same premium for the same age and plan and accept only such risks as will in the aggregate give the company a favorable mortality.

For the purpose of illustrating this, let us classify all risks accepted by an insurance company into three groups, and designate the classes as excellent, average and borderline. Let us assume that the excellent comprise about one-fourth, the average about one-half, and the borderline about one-fourth of all applications approved.

An Excellent Risk

An excellent risk is one that is almost flawless; this means a good insurable interest, satisfactory financial condition, favorable occupation, salubrious residence, good habits, preferably total abstainer from alcohol and tobacco,

excellent family history with respect to transmissable disease and to longevity, no previous illnesses of any moment, favorable height and weight and perfect physical condition of the vital organs, so far as can be determined by a first-class examiner of experience. The mortality of this class is unquestionably very low. Of course, accidents and accidental diseases, such as pneumonia, typhoid, appendicitis, infections in general affect them, but they are not prone to hereditary affections, nor to the evil consequences of bad habits or of maladies following in the train of previous serious illnesses.

As a guess, I should say that these risks would not show a mortality of greater than 40 percent for many years after their being accepted. It might be well for the agent to remember, in soliciting business and in being met with the argument that the prospect considers himself too healthy to die, that even the best insurance risk is prone to accidents and accidental diseases, and that these causes comprise about 30 percent of the death losses that a company is called upon to pay.

The "average" case shows some flaw; it may be the occupation, or insurable interest, the environment, or habits, or family history, or build, or previous illness, or slightly defective organs. Occasionlly there is a combination of several of these defects. The mortality among these groups is of course higher than among the excellent cases.

Finally, the borderline risks are those that just escape declination.

Reviewing this classification, it may be roughly stated that one-fourth of acceptable applicants are excellent, with a mortality of about 40 percent. One-half are average, with a mortality of, let us say, 60 percent. One-fourth are borderline, with an average mortality of 90 percent or slightly more.

A Fair Average Mortality

Casting up, these mortalities give an average of about 62.5 percent—which is an excellent showing for a company of average age and doing a growing business.

By further analyzing these figures, you will understand why standard companies can accept a small percentage of cases showing a mortality of 100 percent, or even slightly

in excess of this. To accept only the gilt-edge or average risks would keep down the mortality, but the percentage of rejections would be so high that the agent would be driven from the field.

Most of the controversies between the agents and medical directors arise in connection with the rulings on borderline cases. It is, in the first place, absolutely essential that the medical director fix his rules in such a way that the percentage of borderline cases will not be proportionately too high; and then it is as equally essential that he adhere to his rules. This would be comparatively easy to do, if all insurance medical departments made the same rulings, but medical directors differ a great deal in the importance they attach to certain impairments. Perhaps it is just as well that this is so, because now it is possible for a borderline case, that can not secure insurance in one company, to obtain it in another.

Medical Departments Differ

This furthermore explains what is sometimes so difficult for a medical director to make clear to an agent, namely: That the fact that an applicant has been declined by one company and promptly accepted by another, is no evidence that the medical director is unnecessarily strict. No company can afford to be lenient with reference to all classes of borderline cases. As I explained before, medical departments differ in their rulings; some are quite lenient in treating family history of tuberculosis, or blood pressure, or casts in the urine, while the same company may be pretty strict regarding underweight, or overweight, or a history of gallstones, or ulcer of the stomach. And it will explain another perplexing situation—Why is it that a medical director will decline an overweight applicant if he weighs 220 lbs. and perhaps accept him if he weighs 218? The difference seems to be rather insignificant, but as a matter of fact, even at 218 lbs., the applicant is distinctly borderline and probably unprofitable to the company; but the medical director approves him on the same principle that the merchant sometimes sells his wares below cost—it is a necessary part of the business and stimulates trade. The loss incurred thereby is counterbalanced by the profits from more desirable applicants.

by his recommendation. Often a statement from the applicant's attending physician is of a great deal of help in assisting the medical director to arrive at a conclusion.

I often think that the agents do not call for the cooperation of the medical department often enough. It is well to remember that the medical director would much rather approve than decline a risk; that he is interested in seeing the agent make a success of his business; and that the agent and he would be much better friends if there were a better understanding and cooperation in handling the borderline cases.

CHAPTER VII

DISEASES OF THE LUNGS

TUBERCULOSIS

TUBERCULOSIS is a disease due to the growth in the human body of the tubercle bacillus. Just as seed planted in the ground will, under favorable conditions, grow and propagate, so will the tubercle bacillus (which is really a minute vegetable growth) develop and spread when planted in the human soil.

The tubercle bacillus, having gained a foothold in the body, sets up an inflammatory reaction in the form of a minute spherical body or "tubercle"—hence the name of the disease—tuberculosis. Pretty much the same thing happens when a splinter finds its way into the skin—an inflammatory reaction is set up and an inflammatory nodule is formed around the splinter.

The subsequent events depend first on the vitality of the tubercle germ, and secondly on the ability of the body to resist its growth. Under the most favorable conditions, the tubercle germ is destroyed and the tubercle disappears, probably through absorption, leaving at the most a little scar, such as is left after a pin-prick in the skin. Under less favorable conditions, the tubercle is walled off from the rest of the body by a capsule or scar—this prevents further growth, propagation and spread of the tubercle germs. But the germs remain alive inside of this capsule. In the least favorable cases, the tubercle enlarges, other new tubercles form along the edges from the spread of the germ (like blackberry runners on the ground), the tubercle bursts open and forms ulcers and eventually large areas of the tissues affected (lung, kidney, intestines, etc.) are destroyed.

Is It Hereditary?

There are certain theories with reference to the development of tuberculosis that are interesting from the insurance standpoint. Modern study makes its exceedingly likely (1) tuberculosis is not inherited in the sense that the tubercle bacillus is planted in the child's body before birth. It is not improbable, however, that weak tissues may be inherited and make the child more liable to having the tubercle

bacillus grow in the body, when it happens later in life to settle in the lung, etc., just as certain seeds will grow in certain soils and not in others; (2) that the disease is acquired, as a rule, early in life, usually before the age of 18; (3) that when the tubercle bacillus once gains a foothold in the body, it may lie dormant or quiescent for many years; (4) that a lowering of the general health due to light weight, typhoid fever, measles, overwork, dissipation, etc., tends to favor the development and spread of the germ in the body; (5) that practically everybody who lives to be 40 years old has become infected with the germ; (6) it is not improbable that a person once moderately infected cannot again be infected by other tubercular germs, but that the germs already in his body will multiply if the general health becomes impaired; (7) it is most fatal between the ages of 18 and 30, and the danger decreases slowly with advancing age. Very old persons, however, again become more liable to the dangers.

While the infection (i. e., the time when the tubercle bacillus finds a foothold in the body) usually occurs before the age of 18, it nevertheless can occur later in life, especially if the exposure is prolonged and intimate, particularly if the person has not been immunized in previous years by an infection of moderate degree—probably in the same way that a good thorough vaccination protects better against smallpox than does a slight inoculation.

From the Insurance Standpoint

From the insurance standpoint it has been ascertained that a family history of tuberculosis may be practically disregarded past the age of 35 and certainly after the age of 40, and that the question of nutrition of the applicant (i. e., the fact that he is of good weight and color) is of more significance than the family history. Even between the ages of 20 and 35, the family history plays very little part, provided it can be established that no recent infection by the tubercle bacillus has occurred and provided the applicant is above the standard weight and in a favorable occupation and environment, and not prone to dissipation.

The medical departments of the various companies are not yet in strict harmony in their rulings regarding a family history of tuberculosis. Fomerly it was customary to limit risks at the younger ages to endowment insurance, but this was manifestly illogical, because if there was any increased risk to the company at all, it was certainly during the terms of the endowment insurance. If these applicants live to be older than 40, their chance for longevity is as good as any other risk. Today the tendency is to disregard a family his-

tory of tuberculosis past the age of 40, and even past the age of 30, if the occupation, environment and weight are good. Those companies which accept them before the age of 30 consider them border-line cases, and select severely especially with reference to weight, exposure, environment, occupation and previous illness.

Agent Should Keep Posted.

The agent in the field must keep himself advised as to the attitude of the medical department of his company. When he submits a risk with a tubercular family history, he should impress upon the applicant that he should give detailed information with reference to exposure to tuberculosis in past years, and whether in physical build he resembles those members of the family who have had the disease. In choosing his prospect, especially at the younger ages, he should avoid those who are light in weight, or those who have suffered from such affections as pleurisy, blood spitting, chronic bronchitis or "run-down" conditions. The occupations that have an unfavorable influence are particularly clerks, bookkeepers, office assistants, printers, and those working indoors without much fresh air, sunshine or healthful exercise.

What Cases Are Declined

Applicants giving a history of having had tuberculosis of the lungs are usually declined by companies issuing only standard insurance. While it is probably true that every person aged 40 or over has been infected by the tubercle germ, the disease in most of them has not advanced beyond the stage where it has shown any changes, as evidenced by damage to the lungs, or by the finding of tubercle bacilli in the sputum. Where the infection has progressed to this stage at any time in the past, relapses are very common; and furthermore, persons of this type are very prone to show a high death rate from other causes, such as pneumonia, Bright's disease and diabetes. In very exceptional cases, standard insurance companies will issue limited amounts to these risks, provided at least ten years have elapsed since recovery, and the weight, environment and occupation are good, and the damage to the lungs has been slight.

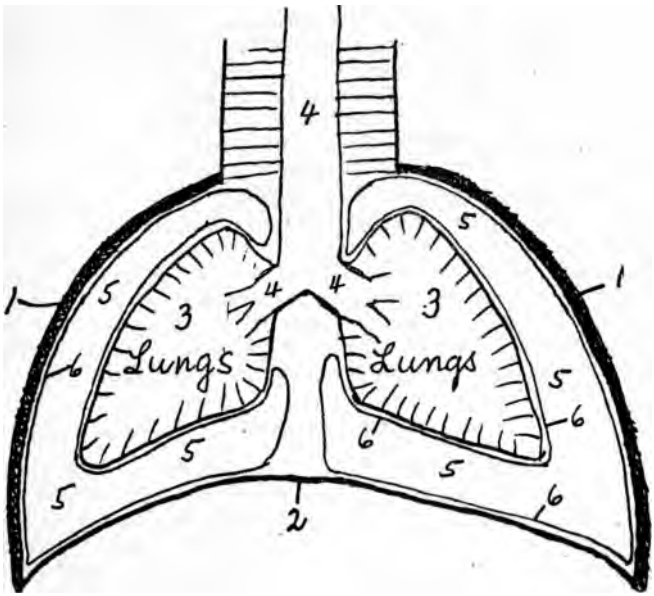
Tuberculosis of the bones (particularly hip disease) and tuberculosis of the glands (scrofula) are generally not viewed as being as serious an impairment as tuberculosis of the lungs. They are, however, distinctly border-line cases

and not generally accepted by all companies and then, usually, only when there has been no relapse for at least ten years, and all other conditions are favorable. The Medico-Actuarial Investigation gives a mortality of 113 percent where one attack of tubercular glands occurred over ten years ago, and of 120 percent where there was a history of one attack of tubercular bone disease (hip, spine and other joints) ten years prior to application.

CHAPTER VIII

SCHEMATIC REPRESENTATION OF LUNGS

Suspended in Chest Cavity



1—Chest Walls.

2—Diaphragm.

3—Lungs.

4—Trachea and Bronchial Tubes.

5—Pleural Space.

6—Pleural Membrane.

In healthy conditions the lungs are pressed against the chest walls and diaphragm and are not separated from each other, as shown in the diagram.

PLEURISY

THE lungs are collapsible bags, very much like the toy rubber balloons that children inflate with a wooden mouthpiece. They communicate with the outside air through the bronchial tubes and nose. They are suspended in a closed cavity—the chest cavity. This cavity is formed by the domelike chest walls above and the diaphragm below. The lungs and the heart and a few other structures fill up the chest cavity. The lungs are not attached or grown to the inside walls of the cavity and diaphragm. On the contrary, the inner wall of the chest cavity, the diaphragm and the outer surface of the lung proper are lined with a very smooth membrane that permits the opposing surfaces to rub against each other smoothly in the act of breathing. This membrane is known as the pleura and the space between the two rubbing surfaces is called the pleural space.

When the pleura becomes inflamed, it becomes roughened. If the inflammation is severe, a watery fluid exudes from the lining surfaces and collects in the pleural space. In certain cases, the fluid that is formed consists of pus. Where the pleura becomes merely roughened, the disease is known as dry Pleurisy. Where the fluid that forms is watery, it is called Pleurisy with effusion, and where the fluid consists of pus, it receives the name of Empyema.

Borderline Case

Pleurisy assumes importance from the medical insurance standpoint, in that it is frequently the forerunner of tuberculosis of the lungs. This is particularly true for Pleurisy with effusion and Empyema. If five years have elapsed since the attack, and if tuberculosis has not developed during that time, it is usually assumed that the danger of its development is so far diminished that the applicant can be considered for standard insurance, provided his weight, environment, occupation, etc., are favorable, and the lungs are normal. These cases are looked upon as borderline cases until at least ten years have elapsed since the attack.

The Medico-Actuarial figures indicate a mortality of 146 percent for one attack within five years of the date of application, and a mortality of 113 percent for one attack between five and ten years prior to application, and 92 percent

for one attack more than ten years prior to application. As might be expected, the deaths experienced from tuberculosis were very high, particularly at the younger ages.

Rigid Selection

The Agent, in submitting a case of this sort, must expect rigid selection on the part of the medical director. It is always well to have the applicant procure from his attending physician an exact diagnosis. Very frequently, because a patient has a slight pain in his side, the physician makes a diagnosis of Pleurisy, when in reality there exists only a little muscular rheumatism of the chest, or a strain of the muscles of the chest wall, or an intercostal neuralgia or indigestion. A statement from the attending physician will clear up the matter and may make it possible for the medical director to give the applicant a more favorable consideration. It is well, too, that the attending physician indicate the variety of Pleurisy, because dry Pleurisy is a less serious impairment than Pleurisy with effusion, or Empyema.

CHAPTER IX

RESPIRATORY ORGANS

Asthma (Spasmodic)

THE act of breathing, or respiration, consists of two acts—inspiration (sucking air into the lungs) and expiration (expelling air from the lungs). The air enters the lungs through the bronchial tree, which is a system of hollow tubes, which branch and subdivide from a central trunk (or trachea) into smaller branches (bronchial tubes), and into still smaller twigs (bronchioles), which terminate in little bulbous air sacs or alveoli (analogous to leaves), where the blood gets rid of its waste gases (carbonic dioxide) and absorbs the necessary oxygen from the air. The inner surface of the entire hollow bronchial tree is lined with a mucous membrane, similar to that which is found in the nose. The conducting tubes are not merely fixed inflexible tubes. They are somewhat elastic, like rubber tubing, and especially the smaller ones have circularly arranged muscles surrounding them. When these little muscles contract, they cause a narrowing of the passageway (or lumen) of the tubes and thus make it more difficult for the air to reach the air sacs (alveoli).

Asthma (spasmodic asthma) is a disease in which there occurs, quite frequently, attacks of intense shortness of breath and difficulty in breathing. It is no doubt due to a contraction of the circular muscles found in the smaller tubes. This is accompanied by a congestion of the mucous membrane, which still further narrows the passageway. The attacks are common in nervous persons, and begin usually in early life. Sometimes they appear to be a result of pure nervousness; at other times, irritating substances, like grain-dust or pollen or odor of flowers, brings on an attack. Hay fever, which is caused by plant pollens, is often accompanied by asthma.

There are other forms of asthma, which are due to entirely different causes. One of these occurs in connection with heart disease (cardiac asthma), and another is asso-

ciated with Bright's disease of the kidney (renal asthma). Cardiac and renal asthma are very serious conditions and are often confused with true spasmodic asthma.

Rated as Borderline

From an insurance standpoint, spasmodic asthma is of importance, because risks giving this history are rated borderline. The age of the applicant, the number of attacks and date of the last attack must be carefully considered. Persons with a history of only one attack, occurring over two years ago, are apparently fair average risks—the Medico-Actuarial Investigation gives a mortality of 104 percent. —but where the attacks are more frequent, especially at the older ages, the mortality is 135 percent.

It is probable that the higher mortality at advanced ages is owing to the fact that many cases of cardiac or renal asthma are included among the policyholders investigated, because cardiac and renal asthma are very common past the age of forty, while spasmodic asthma usually manifests itself rather early in life.

Offer Endowment at Age 60

The practice of most companies writing standard insurance is to offer to asthmatics endowment insurance to mature at the age of sixty. Where there is any suspicion of cardiac or renal asthma, the risks are declined. On the other hand, where the case is one of undoubted spasmodic asthma, especially if the applicant is young and the attacks were few, and if there has been a freedom from the disease for five years, life plans are sometimes given, instead of endowments.

An agent submitting a risk with a history of spasmodic asthma should always have his applicant indicate the frequency of his attacks, the date of the last attack and the severity of them. If the asthma occurs only as part of hay fever, this should be clearly indicated, because medical directors view asthma due to hay fever as of much less serious import than the spasmodic form.

Spitting of Blood

Spitting of blood is a vague term, which includes a hemorrhage from the lungs, stomach, throat, mouth, teeth or nose. Hemorrhage from the lungs is known, in medical terms, as

hemoptysis. Hemorrhage from the stomach is called hematemesis, and blood coming from the nose receives the name of epistaxis.

Hemorrhage from the lungs is usually due to some tubercular infection of the lungs. While the blood may at times come from injury to the lungs, or some disease of the bronchial tubes, or disease of the heart, or pneumonia, or from rarer causes, it is generally assumed by insurance medical departments, in the absence of a definite known cause, that tuberculosis exists, because in about 80 percent of the cases consumption develops in persons giving this history.

The Medico-Actuarial statistics are very instructive. In applicants giving a history of one attack of blood-spitting (hemoptysis) within five years of application, the mortality was 151 percent, and the deaths among these policyholders from tuberculosis of the lungs was fully five times the standard rate. The death-rate was particularly high among the younger applicants.

Where one attack occurred between five and ten years prior to application, the mortality rate was 131 percent, and tuberculosis caused three times as many deaths as is normal —the younger ages again showing the heavier death-rate.

With a history of one or more attacks, the last one more than ten years prior to application, the mortality was only 102 percent, although the deaths from tuberculosis of the lungs were still twice the normal.

Cases Usually Refused

Accordingly, most companies doing a standard business refuse to accept these risks, especially at the younger ages, unless fully ten years have elapsed since the last attack of blood-spitting. Even then, care is exercised in selecting only applicants of good weight, environment, occupation and family history.

Term Rather Vague

From the agent's viewpoint, it is well to remember that blood-spitting is a term that is rather vague. Blood coming from the mouth, teeth, throat or that which trickles down from the nose into the throat, is usually of very little significance. Blood coming from the stomach is not spat up, but is vomited. Whenever an applicant states that he has spat blood, it is advisable to have him give the examiner the full particulars, so that an exact diagnosis and cause may be es-

tablished. If the applicant was attended by a physician during his attack, a statement from the doctor will frequently clear up matters sufficiently to enable the medical director to approve the risk, which otherwise he would have been compelled to decline.

Bronchitis

Bronchitis is an inflammation of the mucous membrane that lines the inside of the tubes of the bronchial tree. It is due to a great variety of causes, the commonest being an ordinary cold. Generally, it affects only the larger bronchial tubes, especially the trachea. The condition may be acute or chronic. An acute attack lasts, as a rule, a week or ten days, but the chronic forms, especially in elderly persons, may continue for years.

When the bronchial tubes are inflamed by either an acute or chronic inflammation, there is formed on the surface of the mucous membrane a discharge or secretion. When the air that is breathed passes over this secretion, it produces a rustling noise, which can be heard on placing the ear or a stethoscope against the chest-wall. These sounds are known as rales. Tuberculosis is also generally associated with considerable chronic bronchitis and hence rales.

Insurance Treatment

Acute bronchitis is of no moment from the insurance standpoint, unless the attacks are very frequent and very severe; but an agent should not, in justice to his applicant, have a risk examined while he has bronchitis or a cold on his chest. The doctor will report finding the rales and the case will have to be postponed until the applicant has recovered from his bronchitis, because the medical director can never be sure but that the rales may mean chronic bronchitis or even incipient tuberculosis.

Applicants with chronic bronchitis are not acceptable for standard insurance. In many of them, the chronic bronchitis is really an evidence of chronic tuberculosis; in others, it leads subsequently to other serious conditions, such as chronic emphysema, heart-disease, etc.

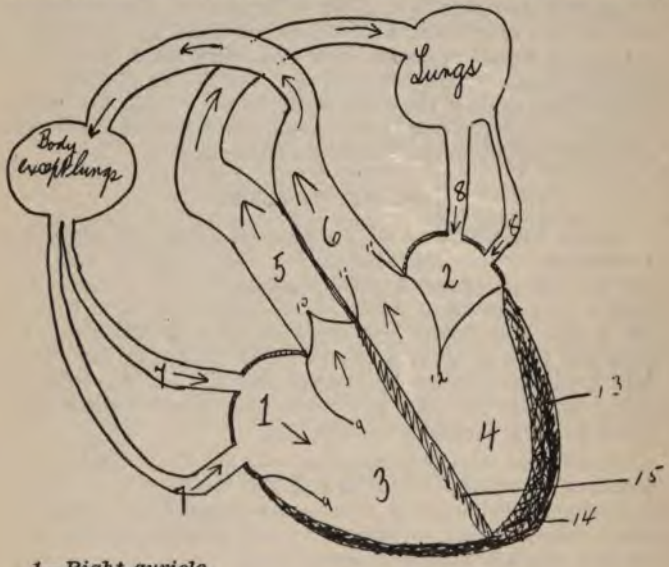
Where a risk gives a history of chronic bronchitis with full recovery and no serious after-results, the risk may be accepted, provided sufficient time has elapsed to convince the medical director of its permanent cure.

CHAPTER X

DISEASES OF THE HEART AND BLOOD VESSELS

SCHEMATIC REPRESENTATION OF THE HEART

[EDITOR'S NOTE.—*This article on heart disease and the next one, on blood pressure are necessarily of a rather scientific character, but should be studied carefully because of the frequency with which conditions of the heart are met in the agent's work. Succeeding articles dealing with other causes for rejection will be found somewhat simpler in treatment.*]



1—Right auricle.
2—Left auricle.
3—Right ventricle.
4—Left ventricle.
5—Pulmonary artery conducting blood to lungs.

6—Aorta, large artery conducting blood to all organs of body except lungs.

7—Veins, returning blood from body (except lungs) to heart.

8—Veins, returning blood from lungs to heart.

9—At the tips of tricuspid valve (open.).

10—At the tips of pulmonary valve (closed).

11—At the tips of aortic valves (open).

12—At the tips of the mitral valves (closed).

13—Muscular heart wall.

14—Apex of heart.

15—Septum of heart. Arrows show direction of blood current.

Heart Disease

THE heart is a double muscular pump. It consists of four chambers—two auricles above and two ventricles below. The auricle and ventricle on the right side are separated from the auricle and ventricle on the left side by a solid wall called the septum.

The blood from all parts of the body except the lungs is returned to the heart by the great veins emptying into the right auricle; the blood passes from the right auricle into the right ventricle through a valve between the right auricle and right ventricle, called the tricuspid valve. The right ventricle, by its contraction, then pumps the blood through a valve called the pulmonary valve, into the lungs, where the blood is aerated. The blood is returned from the lungs to the left auricle, from which it passes through the mitral valve to the left ventricle, which pumps it through the aortic valve into the large arteries, to be distributed to the organs of the body, whence it is again collected in the veins, to be returned to the right auricle.

The valves of the heart are so constructed that blood can pass only in one direction—from the auricle to the ventricle, and from the ventricle into the arteries. When the heart contracts and forces the blood into the arteries, the arteries are suddenly distended to receive the blood. This sudden distention causes the pulse beat. Under normal conditions, the pulse beats are the same in number as the heart beats.

When the heart contracts and forces the blood forward, it is said to be in systole; when the heart relaxes and receives the blood into its chambers, it is said to be in diastole.

In insurance work, the examiner is called upon to detect principally:

(1) Changes in the frequency and regularity of the heart beat.

(2) Leakage or obstruction in the valves.

(3) Enlargement of the heart.

(4) Disease of the heart muscle (myocarditis).

Rarer conditions, such as pericarditis, etc., require no especial description in this article, because they are found rather infrequently.

Changes in frequency of the heart beat are very common. The heart beats normally about 72 times a minute. (By the beat of the heart is meant its contraction or systole.) The rate, however, varies greatly, even in persons in sound health. However, medical directors do not like to accept cases where the heart beat (or pulse rate) is less than 60 or over 85 or 90. The reason for this is that a very slow or a very rapid pulse, especially at the older age, is often the indication of some serious disease of the heart muscles. In addition, a persistently rapid pulse in younger persons is often an indication of a tubercular tendency. On the other hand, a rapid pulse may be due entirely to rather trivial influences—too much tobacco, coffee or tea; nervousness, excitement, fatigue, overeating have a tendency to hasten the pulse. It is well for the agent to remember this and to warn his prospects against these influences before having them undergo examination.

In this connection, the medico-actuarial studies are interesting—a rapid pulse between 90 to 100 a minute shows a mortality of 172 percent when found on examination, while a pulse rate of over 100 gave a death rate of 205 percent. The death rate from tuberculosis was high.

Changes in regularity of the heart are also rather common. There are a great variety of these irregularities. One of them is called sinus arrhythmia and occurs especially in young persons. It consists in the heart beats becoming notably faster during the period when air is drawn into the lungs (inspiration). It is of no significance and is usually disregarded in insurance work.

The other forms of irregularity, however, consisting of dropped beats (heart-block) or of extra beats (extra systoles) or of alternate strong and weak beats (pulsus alternans) or of decided irregular beats (mixed arrhythmias) are serious,

and insurance companies rarely accept these cases, unless subsequent examinations show the heart to be normal. They are usually an evidence of disease or degeneration of the muscles of the heart (myocarditis).

The medical director is usually most lenient in handling the extra systole cases. In these, the heart contracts normally for quite a period and then suddenly makes an extra or premature contraction, which is followed by a longer rest (or diastole) than is normal. Extra systoles are frequently the result of pure nervousness, coffee, tobacco, etc., and disappear when the cause is discontinued. If these circumstances can be shown to be the cause and the pulse is normal on subsequent examination, the medical director generally accepts the risk.

The other irregularities are too dangerous to admit acceptance by standard companies; in fact, the alternating pulse, if persistent, is said to be so serious that few persons live longer than two years after it is detected.

Leakage or Obstruction of the Valves

The valves of the heart, especially those of the left side of the heart (mitral and aortic) frequently become diseased. The mitral valves are most commonly affected as a result of rheumatism, scarlet fever, tonsilitis and other acute diseases. Arterio-sclerosis, or hardening of the arteries, most often affects the aortic valves. The valves are changed in one of two ways: Either they become thickened and shrunken, so that they leak; or the leaflets of the valves become stiffened and adherent to each other, so that the passage of the blood through them is obstructed. When a valve leaks, the condition is called insufficiency (regurgitation); when it is obstructed, it is known as stenosis. Hence, on the left side of the heart we may have a mitral regurgitation, or a mitral stenosis, or an aortic regurgitation or an aortic stenosis. Regurgitation is much commoner than stenosis, and mitral regurgitation is commoner than aortic regurgitation.

These conditions can be diagnosed by the noises (murmurs) that are produced, either by the blood leaking back through the valves (regurgitation) or by the obstruction to the blood stream in passing through the valves (stenosis). Thus a mitral leakage, or regurgitation, produces a sort of musical murmur, heard loudest where the heart beats against the chest-wall (apex of heart) and is heard only during the

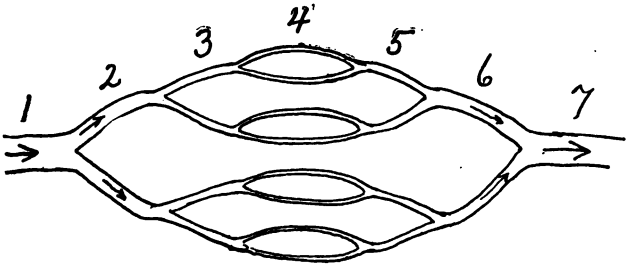
contraction (systole) of the heart, while an aortic regurgitation causes a harsh murmur, which is heard loudest over the upper right margin of the heart and which occurs during the diastole (relaxation) of the heart.

It is a fact that murmurs are sometimes detected in perfectly normal hearts. These are called functional murmurs and the cause of them is really unknown. They are, however, very difficult to distinguish from murmurs due to real valvular disease and hence most companies refuse to accept cases of functional murmurs for standard insurance. However, there are functional murmurs that are sometimes accepted even by standard companies, provided the medical director has great faith in the ability of the examiner. One of these is called cardio-respiratory, and is due to the heart pulsating against the lung; the other is heard over the left upper margin of the heart and is systolic in time. Pure functional murmurs are not accompanied by an enlargement (hypertrophy) of the heart; on the other hand, hypertrophy generally exists where there is a valve disease or myocarditis.

Applicants with real heart murmurs are generally accepted only by substandard companies, but it is well for agents to remember that many persons show heart murmurs only temporarily. Most of the companies will accept a risk who has been declined for insurance on account of a heart murmur, provided after a thorough examination by a competent examiner, no murmur is found. In these cases, it is always best first to write the medical director, to ascertain the practice of the company and the proper mode of procedure.

CHAPTER XI

SCHEMATIC REPRESENTATION OF CIRCULATION OF BLOOD FROM ARTERIES TO VEINS



1. *Artery carrying blood from heart.* (*The Aorta*).
2. *Artery branches.*
3. *Arterioles* (*small arteries*).
4. *Capillaries.*
5. *Venules* (*small veins*).
6. *Vein branches.*
7. *Vein returning blood to the heart.*

Arrow shows direction of blood current.

Blood Pressure

YOU will note by referring to the illustration that the blood flows from the heart through a system of branching tubes back to the heart again.

The large artery, in which the heart pumps the blood, is known as the aorta. The aorta conducts the blood to all the organs of the body, except that which goes to the lungs to be aerated. The aorta sends off a great many smaller branches, and these in turn divide and sub-divide into still more numerous and smaller branches (arterioles) until the capillaries are reached. The blood, after passing through the capillaries, flows into the venules, then into the veins and finally is returned to and discharged into the heart.

The arteries are very elastic, resembling a fine quality of rubber tubing. The walls of the arteries contain some muscular tissue, which is particularly well developed in the arterioles. These muscles are arranged around the arterial tubes in a circular or ring fashion, so that when the muscles contract, they constrict or narrow the passageway (or lumen) through the artery or arteriole.

The blood is pumped from the heart into the aorta, not in a continuous stream, but in spurts—each time the heart beats about three ounces of blood are squirted into the aorta. This occurs seventy-two times a minute when the heart is working normally.

The arteries, being elastic, are expanded every time the heart pumps blood into them. This sudden expansion produces the pulse, which can be felt in every artery—most conveniently, however, at the wrist. The blood is rather thick and sticky and the smaller arteries and capillaries are very small in caliber (the capillaries are only about 1-3000 of an inch in diameter). In consequence, the blood is forced through the smaller arteries (or arterioles) and capillaries with considerable difficulty or resistance. This resistance is known as peripheral resistance. Because the blood encounters so much difficulty in forcing its way through the arterioles, the blood stream has a tendency to be dammed back in the arteries—just as water is dammed back in a drain pipe when the pipe is partially obstructed.

The blood in the arteries is, therefore, subjected to two opposing pressures: (1) The blood from the heart is pushed onward under considerable pressure, imparted to it by the contraction of the heart. (2) The passage of the blood through the arterioles and capillaries is more or less obstructed and has a tendency to be dammed back. This pressure in the arteries is known as arterial blood pressure.

The same principle can be demonstrated in an ordinary garden hose. If, while the water is flowing through the hose, you partially obstruct its escape by squeezing together the outlet of the hose, the pressure of the water in the hose may be raised high enough to burst the walls of the hose, unless the fabric is a very stout one.

During the contraction (or systole) of the heart, the pressure is naturally somewhat higher, because when the heart contracts it spurts the blood into the arteries. This temporary increase in pressure is known as the systolic

blood pressure. During the relaxation (or diastole) of the heart, the pressure is somewhat lower, because no blood enters the arteries from the heart. This pressure is known as the diastolic blood pressure.

It must not be forgotten that even during the diastole of the heart, the arteries never entirely empty themselves—there is always considerable blood in them.

The blood pressure is expressed in millimeters of mercury. If you were to tie a glass tube in an artery and hold the tube upright, and permit the blood to rise in this vertical tube, the blood pressure would force the blood up the tube a distance of about seven feet. In experimenting on animals in physiological laboratories, it is customary to tie glass tubes in the arteries. But these glass tubes are bent in the shape of a "U" and mercury (the heaviest known liquid) is placed in the "U" tube. The blood presses against the mercury, and if the mercury is displaced a hundred millimeters, the blood pressure is said to register 100 mms. A millimeter is about 1-25 of an inch.

To determine the blood pressure in human beings, the method of tying a glass tube in an artery is not, of course, practicable. Instead, an apparatus called the sphygmomanometer, or blood pressure instrument, is used. There are many models of this. Essentially, it consists of an inflatable rubber armlet or cuff, which is bound about the upper arm; a bulb for forcing air into the armlet; and a gauge, either mercury or aneroid, for determining the pressure of air in the armlet. When the cuff is placed about the arm and air is forced into the cuff until its pressure is higher than the pressure of the blood in the artery of the arm, the artery is compressed, so that no blood can pass through it. By diminishing this pressure, a point is reached which permits the blood to pass through the artery. The blood rushing through can either be felt by a return of the pulsation in the artery at the wrist (palpatory method) or, better, by means of a stethoscope it can be heard flowing through the artery at the bend of the elbow (auscultatory method). This point on the gauge registers the systolic blood pressure. The pressure in the armlet is then still further reduced. Sounds continue to be heard with a stethoscope at the bend of the elbow. At the point of diminishing pressure, where these sounds either cease or become modified in a certain particular, the gauge registers the diastolic pressure.

The normal average systolic blood pressure in healthy males is given for five year age periods in the following table:

15-20	120
21-25	123
26-30	124
31-35	124
36-40	127
41-45	129
46-50	131
51-55	132
56-60	135

Variations occur, however, under normal conditions. This variation is about 12 mms. either way. Thus, at age 18, a systolic blood pressure of 108 to 132 is considered normal. The normal diastolic pressure is about two-thirds of the systolic. At age 18, the average diastolic pressure is about 80. The difference between the systolic and the diastolic pressure is called pulse pressure. Thus, if systolic is 120 and diastolic is 80, the pulse pressure is 40.

You can readily understand from the description in the preceding paragraphs that if you increase the rate of the heart's action (rapid pulse), or if the heart contracts with greater power, or if the blood is thickened (becomes more sticky or viscous), or if for any reason the volume of the blood is increased, or if you increase the resistance to the outflow of the blood from the arteries into the capillaries, the blood pressure will be raised.

Practically the most important elements are: (1) The contraction of the arterioles, increasing the resistance; and (2) the increase in force and frequency of the heart. The smaller arteries (arterioles) have the property of increasing or diminishing their own caliber to a marked degree, in virtue of the fact that they possess muscles circularly arranged in their walls. When these muscles contract, the passageway through the arterioles is considerably narrowed and the blood flow is obstructed. These muscles are not under the direct control of the will, as are the muscles of the arm, for instance; but they are, nevertheless, controlled by nerves, which cause them to contract or relax, especially under the influence of excitement or emotional conditions or of drugs.

There is a disease known as hard arteries, or arteriosclerosis, in which particularly the small arteries (arterioles) become thickened and stiff. This makes the passageway (or lumen) through them narrower, and the result is a more or less permanent elevation of the blood pressure. When the arterioles of the kidney are especially affected in this way, a form of chronic Bright's disease develops. In fact, this form of Bright's disease and general arterio-sclerosis are often associated and are probably due to the same causes, producing different symptoms only because they affect different parts of the body.

If the blood pressure remains persistently high, it damages the arteries and throws more work on the heart. A damaged artery will eventually bulge out (aneurism) and burst, and when this occurs in the brain, it causes apoplexy. When the blood pressure is persistently high, the heart must exert a greater force in order to empty its blood into the arteries. When the heart is constantly overworked, it will either enlarge (hypertrophy) or the heart muscle will begin to play out and dilatation of the heart results, or the valves, especially the aortic, will become diseased. Sudden death is often caused by a weakened dilated heart, or by aortic valve disease.

A high blood pressure is sometimes due solely to heart conditions. If the heart becomes enlarged through disease of the valves, or over-exercise, etc., the systolic blood pressure is often permanently raised. A persistent rapid pulse, due to nervousness, tobacco, etc., is often accompanied by a high blood pressure.

In many cases, the heart, arteries and kidneys are simultaneously affected; this is known as cardio-renal disease.

From the medical standpoint, the figures submitted by Dr. J. W. Fisher are of great interest. Risks with a systolic pressure of 140 to 149 mm. showed a mortality of about 75 per cent; where the average systolic pressure was about 153 mm., the mortality was 112 percent; where the average systolic pressure was 161 mm., the mortality was 190 percent.

The practice of some companies is to require blood pressure estimations in all cases; others ask for it only after the age of forty, and in younger applicants, only where the amount at risk is over $5,000 or $10,000. As a rule, where the systolic blood pressure is more than 12 mms. above the fig-

with carbonic acid gas and ash as waste-products. The blood carries the gas and the waste-products to the lungs and kidneys. The carbonic acid is a gas and is thrown off through the lungs, and the ash (or waste-products of non-gaseous nature) is gotten rid of through the kidneys, which excrete it dissolved in the urine. The work of the kidneys is all the more remarkable, in that the blood contains perhaps hundreds of different substances in solution, but in healthy conditions, the kidney picks out only what is intended to be thrown away with the urine.

When the kidneys become diseased, they do not do their work so well; on the contrary, they fail to throw out (excrete) all the waste-products from the blood, and they permit certain substances of value to the body to leak through from the blood into the urine, and in addition, there appears in the urine substances such as casts, that are a direct result of the kidney disease itself. Because the waste-products are not properly disposed of in kidney disease, they accumulate in the blood and, in a manner not clearly understood, they poison the body. Death then ensues from a condition known as uremia.

A study of the urine will nearly always reveal if there is a disease of the kidney. These methods used are:

(1) Estimating the inefficiency of the kidney in throwing out the waste-products from the blood. This requires often an analysis of the blood itself.

(2) The detection of substances that leak through the kidney into the urine, notably the albumin of the blood and red corpuscles.

(3) The finding of substances in the urine that result from irritation or breaking down of the kidney substance itself, such as casts, kidney cells and pus cells.

Insurance work is concerned principally in the last two methods and practically resolves itself into the detection of albumin (albuminuria) and the microscopic finding of casts and pus cells or blood cells. Sugar in the urine is not an indication of kidney disease and it will be discussed in a separate chapter.

Albumin in the Urine

Albumin in the urine is known as albuminuria. Under healthy normal conditions, albumin does not occur in the urine except in very minute quantities, too small to be de-

tected by ordinary tests. But albuminuria is an impairment frequently found as a result of abnormal conditions, and then usually it is caused by the kidney permitting the albumin of the blood to leak through into the urine. The blood is very rich in albumin, but when the kidney is working properly none of this albumin is permitted to filter through the kidney into the urine.

Casts in the Urine

Casts in the urine are known scientifically as cylindruria. The kidney is structurally composed of a great number of long narrow tubes, through which the urine flows after it is secreted from the blood. The tubes are lined on the inside with minute cells (epithelial cells), somewhat as the inside of a chimney is lined with bricks. When the tubes become inflamed, there collects on the inside of the tube a mucous-like secretion, that fills up the tube. A very similar mucous-like substance forms in the nose or stomach when these organs become inflamed. These mucous plugs on the inside of the tube are moulded into rather long narrow cylinders, which are subsequently washed away from the inside of the tube by the pressure of the urine as it flows through the tubes. Thereupon they appear as casts in the urine. Casts are sausage shaped, averaging about 1/50 of an inch in length and 1/500 of an inch in diameter. The microscope is, therefore, necessary to detect them.

There are several varieties of casts—hyaline, granular, epithelial, blood, etc. A hyaline cast is perfectly clear; a granular cast is covered with dust-like deposits; an epithelial cast is covered with the minute cells (epithelial cells) torn away from the inside of the kidney tubule; a blood cast has sticking to it numerous red cells, which are identical with the red corpuscles of the blood.

Blood casts and epithelial casts are more often found in acute inflammations of the kidney; hyaline and granular casts with chronic kidney inflammation, but there are exceptions to this rule.

It is often stated that hyaline casts always occur in the urine of men past the age of fifty. This is not true as a normal condition. The reason they are found most frequently past the age of fifty is because kidney disease is a very common affection past this age.

There are a great many different causes for albuminuria and cylindruria, and they can be divided into—

(1) Faulty conditions elsewhere than in the kidney.

(2) Faulty conditions in the kidney itself.

Albuminuria, Not Due to Kidney Disease Proper

A great variety of conditions may cause the appearance of albumin in the urine, and this in spite of the fact that the kidneys may be apparently healthy. Fevers are nearly always associated with a slight albumin in the urine. Albumin is often found in connection with grave chronic diseases, even when fever is absent in the course of the disease—such as cancer, anemia, liver, heart or lung diseases. Rather trivial causes may produce a temporary albuminuria or casts in the urine, such as slight colds or sore throat, overeating (particularly of meats, spices or eggs), strenuous mental efforts or over-exercise, especially in persons unaccustomed to hard physical exertions. In some susceptible persons albuminuria results from merely standing up for a long time or being on their feet a great deal. Young men below the age of thirty are very prone to show traces of albumin in their urine, and in them it is of less moment than when it occurs at the older ages. An inflammation of the bladder or prostate gland or gonorrhoea will cause an albuminuria.

Casts are usually absent when albuminuria is caused by conditions outside of the kidney.

Albuminuria Due to Disease of the Kidney

An inflammation of the kidney is known as Nephritis, or Bright's Disease. There are several varieties of the disease. The condition may be acute, lasting only a few weeks; or sub-acute, lasting a few months; or chronic, which may exist for many years. The acute forms are most prone to follow acute diseases, such as scarlet fever, tonsilitis, blood poisoning, pneumonia. Certain poisons, such as mercury (corrosive sublimate), phosphorus, carbolic acid, may produce it.

The chronic forms may result from an uncured acute attack, but most frequently the chronic forms result from a slow degeneration of the kidney itself or a slowly developing inflammation that eventually destroys most of the kidney tissue. The form most frequently encountered is known as

chronic interstitial nephritis. This variety develops particularly in stout persons, who work too hard, eat and drink too much and carry too heavy a burden of responsibility. Alcoholism and syphilis often play a part. This form of kidney disease is treacherous, in that it may exist for years without causing any symptoms that attract the patient's attention; only through a careful urinalysis—chemical and microscopic—can an early diagnosis be made.

As a rule, in the very earliest stages, only casts are found—usually hyaline casts. As the disease progresses, albumin appears, but the amount of albumin and number of casts may be very small throughout the course of the affection. The blood-pressure usually becomes raised as the disease progresses. The explanation for this rise was given in the article on blood-pressure.

Insurance Practice

From the insurance standpoint, albuminuria and cylindruria are of great importance, particularly past the age of forty, because kidney disease causes about 8 percent of all deaths paid by insurance companies past the age of forty-five.

The finding of albumin and casts by no means indicates that Bright's disease exists, especially if they are found only occasionally. Where, however, they are found persistently, even in small quantities, the diagnosis is fairly certain.

The Medico-Actuarial studies are of considerable interest. Where albumin is found on examination, the mortality was 131 percent. Cases in which there was a history of albuminuria within two years of date of examination showed 103 percent.

An important contribution on this subject by Dr. Oscar H. Rogers has shown that where albumin is found in two or more specimens on examination, the death-rate was 148 percent; and the impairment was demonstrated to be particularly serious past the age of forty. Where casts were associated with the albuminuria, the ratio was 250 percent.

It appears, therefore, that albuminuria is a very serious impairment, particularly if found oftener than once, or if found after the age of forty.

The practice of the various medical departments varies. If albumin is found at the time of the examination and the risk is over forty years old, the application is generally de-

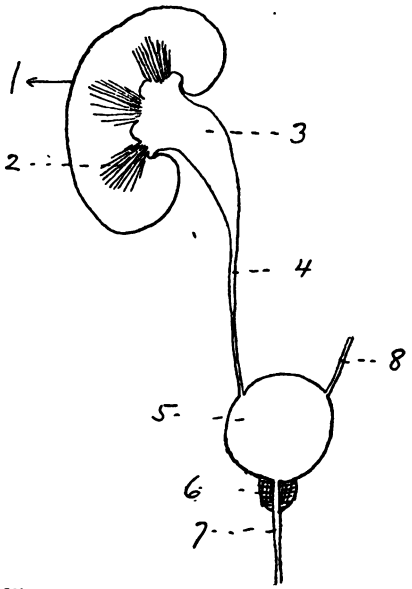
clined or postponed from three to six months. At the earlier ages, if albumin is found only once, and if three or more samples are found normal and the risk is otherwise unexceptionable, the application may be approved at once, especially if no casts are found. Where there is a history of kidney disease or albuminuria within the past five years, repeated examinations of the urine are usually made, and if these are normal, the risks are generally accepted for favorable plans.

Casts without the presence of albumin are treated in very much the same way, although casts (including even hyaline casts) are probably more serious than albumin alone.

From the agent's standpoint, it is well to remember that comparatively trivial causes may provoke an albuminuria or cylindruria. Slight cold, tonsilitis, over-exertion (such as walking long distances and hurrying up to the examiner's office) undue business strain and mental anxiety and worry, exhausting railroad trips are likely to cause the impairment. When it occurs under these conditions, the albumin is probably of no significance, but the medical director must assume that the condition is due to more serious causes and act according to his fixed rules, which are usually pretty strict for the older ages.

CHAPTER XIII

SCHEMATIC REPRESENTATION OF URINARY APPARATUS



1—Kidney.
2—Kidney-tubules.
3—Pelvis of kidney.
4—Ureter, right.
5—Bladder.
6—Prostate gland.
7—Urethra.
8—Ureter from left kidney.

Pus in the Urine

THE urine, after being secreted by the kidney, is emptied into a small cup-like reservoir immediately attached to the kidney and known as the pelvis. From the pelvis, the

urine is conducted through a long, narrow tube, known as the ureter, which carries the urine to the bladder. From the bladder the urine is voided through a membranous tube, which is called urethra. Where the urethra joins the bladder is an organ about the size of a small walnut, which receives the name of the prostate gland. The entire tube, from the kidney to the end of the urethra, is lined on the inside with a smooth, mucous membrane.

Pus in the urine, or pyuria, results from an infection of the kidney, pelvis, ureter, bladder, prostate gland or urethra. By an infection is meant the growth in the body of certain germs, especially the pus forming (or pyogenic) germs. As an illustration, when ordinary mold grows on the surface of jelly, the jelly has become "infected" by fungous germs, which have settled upon and propagated on the surface of the jelly.

Pus forming germs may settle on the mucous membrane of the urine-conducting tubes as a result of a great many different conditions: Thus tuberculosis or abscess of the kidney, a stone in the pelvis of the kidney or in the ureter or in the bladder, inflammation of the bladder, the result of injury, tumors, gonorrhoea, typhoid fever, etc., may all cause pyuria. The commonest cause of pyuria is probably gonorrhoea. An inflammation or enlargement of the prostate gland and chronic cystitis (inflammation of the bladder) rank, perhaps, next in frequency.

Unless the pus is formed in very large amounts, it can be detected only through a microscope examination of the urine. Pus cells are only about 1/2500 of an inch in diameter. They are really derived from the blood. In the blood are found two kinds of cells—the red cells and the white cells (or leucocytes). When certain disease germs invade any part of the body, the white cells of the body leave the blood stream and attack the germs. The white cells constitute, as it were, an army that repels the invasions of disease germs. Those white cells that are killed in the contest are called pus cells. Pus cells are, therefore, dead white blood cells.

A few pus cells often occur in the urine of healthy persons. It is only when they are found to be rather numerous that they are looked upon as an impairment.

Our Medico-Actuarial knowledge of pyuria is rather incomplete, for the reason that insurance companies have accepted very few of these cases—too few to enable a satisfac-

tory study to be made. However, Dr. Rogers states that where pus in the urine is combined with albumin (and the association is pretty frequent), the impairment is serious—more so than where albuminuria exists alone.

From the agent's standpoint, it is well to remember that gonorrhoea is one of the commonest causes of pus in the urine. Many persons will show quite a few pus cells in their urine for many years after an attack of gonorrhoea. However, pus resulting from this cause is probably of very little significance. The pus in these cases is formed in the urethra and is, therefore, washed out by the urine which is first voided. In order to prevent contamination from this source, it is always well to have an applicant void his urine in two beakers—about one-half in the first and the other half in the second. The second half voided will not show as many pus cells, if the pus comes solely from the urethra. Most companies prefer that this portion of the urine be chosen for microscopical examination.

Blood in the Urine

Blood in the urine is known medically as hematuria. It usually results from conditions similar to those causing pyuria: Thus, inflammations, injuries, tumors, stones, ulcers, or tuberculosis of the kidney, or of the pelvis, ureter, bladder, prostate or urethra, are usually accompanied by some blood in the urine. In rarer cases, all of the structures may be normal and yet large quantities of blood will escape from the kidney, notably in malaria (black water fever), black smallpox, profound anemias, heart-disease, or from certain poisons.

Red blood cells are coin-shaped—that is, they are circular and flat. When viewed under the microscope they have a reddish yellow cast. They are about 1/3000 of an inch in diameter, and therefore, can be detected only by the microscope, unless there has been a severe hemorrhage, in which case the urine has the appearance of diluted blood.

A very few red blood cells are very commonly found in a large percentage of urines of perfectly healthy persons. It is only when their number exceeds a certain limit that they represent impairments. Like most of the other impairments, that are of importance from the insurance standpoint, blood cells in the urine may arise from the most serious or from the most trivial conditions. Rather numerous blood

cells will often occur in the urine of persons who had gonorrhoea years ago, and they are frequently found, due to slight injury, after intercourse. They also occur, as a result of contamination, in women during menstruation.

From the Medico-Actuarial standpoint, our statistics on blood in the urine are very meagre, for the reason that these cases have usually been declined. It is evident, however from Dr. Ogden's studies, that when they are found in very small numbers, they are of no significance.

The practice of most companies is to disregard the finding of only an occasional blood cell in the urine. Where the number is moderate, additional samples are requested and if these are normal, the application is approved. The persistent presence of moderate numbers or the finding of numerous blood cells calls for a rejection.

The agent must remember that where a microscopic examination of the urine is to be performed, it is always best to observe the same precautions as suggested in the article on pus in the urine, namely: to have the urine voided in two beakers and submit that from the second beaker for examination. In this way, contamination from the urethra is avoided.

Specific Gravity

THE specific gravity of the urine is the weight of the urine compared with water. Urine consists of water holding in solution various soluble chemical substances; the greater the proportion of dissolved substances, the higher is the specific gravity. The specific gravity of water is arbitrarily fixed at 1000. If the weight of the urine is 2% heavier, it is given as 1020.

Normally, urine has a specific gravity of about 1018, but it varies at times, even in healthy persons, from 1001 to 1035. As a rule, the variations are confined within the limits of 1012 to 1028. A great many conditions will raise or lower the specific gravity. Thus, excessive water drinking, cold weather, excitement, restricted solid diet, etc., will lower it; the reverse influences will raise it. In certain diseases, it is often persistently high, notably in diabetes, in which disease the dissolved sugar makes it heavier. In chronic Bright's disease, it is frequently persistently very low.

As a rule, most companies do not object to a high specific gravity of the urine, provided it is otherwise normal and the presence of sugar has been certainly excluded. But a low specific gravity is objectionable for two reasons: First, a urine of low specific gravity contains so much water that albumin, sugar and other abnormal constituents are likely to be so diluted that the ordinary chemical tests can not be satisfactorily performed. Secondly, in at least one very serious form of Bright's disease—chronic interstitial nephritis—the urine is persistently of low specific gravity and in many cases, almost throughout the entire course of the disease, the other evidences of Bright's disease, such as albumin and casts, may be practically absent. In fact, some excellent physicians maintain that persistent low specific gravity of the urine is more characteristic of this disease than are albumin and casts.

Our Medico-Actuarial knowledge of very low specific gravity is very meager, for the reason that practically no companies will accept the risks, if the condition is persistent. Where the specific gravity has been found below 1012 (some companies require 1016 or even 1018), further examination of the urine is required. If subsequent tests are normal, the first finding is disregarded.

It is well for the agent to remember that excessive water drinking from one to three hours before an insurance examination is very likely to lower the specific gravity. This will subject his applicant to the annoyance of submitting other samples. Also, when the specific gravity has been found below the limits set by the company, it is advisable to have the applicant restrict the fluids in his diet from six to eight hours before voiding another specimen for examination.

Renal Colic and Calculi

The urine contains a great many different chemical substances, such as urea, uric acid, phosphates, chlorides, etc., that are dissolved in the water of the urine. Some of these are very soluble and others are not, and the solubility varies considerably, depending on whether the urine is acid or alkaline in reaction. Thus uric acid is much less soluble in highly acid urine, while the phosphates are less soluble in alkaline urine. Furthermore, the amount of these substances

in the urine varies considerably in different individuals. Persons who eat a great deal of meat, or who are of a gouty tendency, will void urine containing more than the average amount of uric acid.

When these chemical substances (notably uric acid and phosphates) are not readily dissolved by the water in the urine, they are likely to be thrown out of solution, that is, precipitated. When this occurs, they have a tendency to form stones or calculi. As an illustration, when too much salt is dissolved in water, the salt has a tendency to precipitate and form salt crystals.

This precipitation, especially of uric acid, occurs very frequently in the pelvis of the kidney. When the stones thus formed are very small and numerous, they readily descend through the ureter, without causing any inconvenience, and then appear in the voided urine as "renal sand." When they grow about the size of a split pea and then enter the ureter, they cause excruciating pain in their descent through the ureter to the bladder. From the injury they inflict on the ureter, blood appears in the urine. This condition is known as renal colic or kidney stone colic. Occasionally they grow of such size (as large as a hazel nut) that they can not enter the ureter, but remain in the pelvis of the kidney. When this happens, they are prone to set up an inflammation of the pelvis and of the kidney, accompanied by blood and pus in the urine. This inflammation may eventually destroy the affected kidney. Kidney stones, after entering the bladder, are generally voided in the urine, but sometimes they remain in the bladder, where they grow in size (often as large as a walnut) and they are then known as bladder stones or vesical calculi.

Stones consisting of phosphates are more prone to develop primarily in the bladder, as a result of an inflammation of the bladder, which makes the urine alkaline and thus precipitates the phosphates in the bladder.

A history of renal colic is frequently given by applicants for insurance. The Medico-Actuarial Investigation gives a mortality of 102% where an attack has occurred between two to ten years prior to application, and 123% where the attack occurred over ten years ago. Two or more attacks at any in the past showed a ratio of 116%.

This somewhat favorable experience is no doubt due to very rigid selection, as is shown by the fact that when combined with overweight the death rate was 169%. Agents must expect very rigid selections among these risks. The weight, microscopic urinalysis and blood pressure are all carefully considered. The practice of most companies is to postpone these cases for two or three years after the last attack, and then to take only those that are unexceptionable in every other respect.

The diagnosis of renal colic is not always accurately made. The prominent symptom, of course, is the abdominal pain, but pain in the abdomen results from many other common complaints—appendicitis, typhoid fever, indigestion, gallstones, ulcer of stomach, etc. Sometimes applicants, on account of an attack of lumbago or backache, decide in their own minds that they have "kidney trouble" or "kidney stone," and they are usually mistaken in their own diagnosis. It is always a wise plan, where any doubt exists, to have the applicant obtain a statement from his attending physician, confirming or refuting the diagnosis. This is of a great deal of assistance to the Medical Director in acting on the application.

CHAPTER XIV

IMPAIRMENT OF BLADDER

Stricture of the Urethra

AS a result, most frequently of protracted chronic gonorrhoea, and more rarely of injury, the canal of the urethra becomes narrowed, so that, in exaggerated cases, there may be a complete obstruction. The narrowing of the channel makes it more difficult for the bladder to empty itself, and in consequence, inflammation and dilation of the bladder ensues and this may be followed by an infection and inflammation of the kidneys.

The degree of the stricture is determined by the passage of sounds. The sound is a slightly bent, cylindrical steel rod, long enough to be inserted through the urethra into the bladder. Sounds are made in different thicknesses. The normal urethra accommodates a sound which is 30 millimeters in circumference (1 1/5 inch). As a rule, strictures attract very little attention until they no longer permit the passage of sounds of 15 millimeters or less.

A history of stricture is given not uncommonly by insurance risks and in every case it calls for an especial investigation as to the extent, time of occurrence, size, location of the stricture; also, whether it was properly treated and whether any complications, especially in connection with the bladder or kidney, exist. It is only when these risks are in every other way unexceptionable, when the stricture has been entirely relieved, and when no complications exist that these applications are eligible for standard insurance, and even then, they must be viewed as distinctly borderline. Risks having a stricture at the time of examination are rarely accepted for standard insurance—only the most favorable cases, after rigid selection, are accepted and then usually for endowment insurance.

The Medico-Actuarial Investigation gives a mortality of 114%, but the death-rate is distinctly higher at the older ages than at the younger. If an agent hopes to secure favorable consideration of a prospect giving this history, it is

always best to submit all the necessary data with reference to location and size of stricture, etc., from the attending physician or surgeon, before submitting an application for standard insurance.

Hypertrophy of the Prostate Gland

YOU will note from the illustration that the prostrate gland is in close relationship to the prethra. At ages past forty, the gland is very prone to become enlarged; this condition is known as hypertrophy. When this occurs, the channel of the urethra is generally narrowed, so that a stricture develops and bladder complications are very likely to ensue. An hypertrophy of the prostate gland can be diagnosed through the passage of sounds or by feeling the size of the gland through a rectal examination.

Risks having an enlarged prostate are not eligible for standard insurance, because the majority of the cases require a serious operation for its cure. Where the gland has been successfully removed, individual cases are sometimes accepted after a most rigid selection, provided a sufficient time has elapsed since the operation.

Cystitis

By cystitis is meant an inflammation of the bladder. The disease may be acute or chronic, and it is due to a great number of different causes. Certain poisons, errors in diet, infectious diseases, like typhoid fever, etc., injuries, gonorrhoea, local conditions, such as tuberculosis, tumor or stone in the bladder, and enlarged prostate and stricture of urethra are the commoner causes. It is very prone to occur at the older ages, when it is very likely to be of the chronic variety. The danger of a cystitis lies particularly in its tendency to extend upwards along the ureter and involve the kidney, in which case a very dangerous form of kidney inflammation results.

In insurance examinations, a history of cystitis is not uncommon, the causative factor being usually gonorrhoea at the younger ages, and enlarged prostate or renal calculus at the older. The urine in cystitis is usually alkaline in reaction and contains considerable pus, and sometimes blood.

Applicants who have cystitis at the time of the examination are not insurable, but they are accepted after full re-

covery, provided the urine is normal, chemically and microscopically, and provided the cause of the trouble has been remedied. They are, however, distinctly borderline risks. The Medico-Actuarial Investigation gives a mortality of 112% for risks who have cystitis within five years of date of examination.

CHAPTER XV

SYPHILIS

SYPHILIS is a contagious disease, caused by a germ—the treponema pallidum. The first manifestation, or primary lesion, is known as a hard chancre, which appears at the seat of inoculation about three weeks after exposure. It is a single hard lump, that ulcerates and forms a sore about the size of a large pea. About six weeks later, the constitutional symptoms manifest themselves in the form of skin eruptions of various sorts, ulcers on the tongue and throat, some fever and enlargement of the lymph glands. Still later, larger tumor bodies (called gummata) may appear in the skin, bones or internal organs. In a certain percentage of cases, late syphilitic manifestations, such as arterio-sclerosis, heart disease, locomotor ataxia and paresis, may occur. An interval of twenty or thirty years or longer may supervene between the appearance of the primary lesion and the late syphilitic manifestation.

Shortly after the appearance of the hard chancre, the blood will give, when tested by certain laboratory methods, a reaction, known as the Wassermann reaction. This test persists more or less throughout the course of the disease, but may disappear as a result of energetic treatment. Its absence, however, does not prove that the affection has been entirely eradicated. Although the disease may be permanently cured, there is no positive way in any individual case of demonstrating conclusively that the disease has been eradicated:

Syphilis has, within the last fifty years, changed its character. Formerly, it was not unusual to see cases of very severe skin eruptions, of extensive ulcerations of the skin and bones, and of gummata of the internal organs. These lesions are now rather infrequently encountered; but, on the other hand, it appears that the late syphilitic manifestations—paresis, arteriosclerosis, locomotor ataxia—are growing commoner. In fact, nowadays, so slight are the early disturbances, that many persons having had syphilis

doubt whether they were ever affected; but the mildness of the early symptoms by no means protects against the ravages later in life.

Syphilis is a very prevalent disease, especially in the larger cities. It is frequently encountered as an insurance impairment and is of great importance, in that, on the average, it greatly diminishes the likelihood of an applicant living out his expectancy. In fact, persons having had the disease are not eligible for standard insurance and this is true, irrespective of whether or not they have undergone thorough treatment, or been free from all symptoms for years, or are married and have healthy children.

The Medico-Actuarial studies are very interesting, but not easy to interpret. Among applicants giving an undoubted history of syphilis, thoroughly treated, the mortality was 188%, while among applicants who gave an undoubted history, but were not thoroughly treated, the mortality was 174%. This does not necessarily mean that treatment unfavorably influences the subsequent course of the disease. It is more likely that medical selection was much more rigid for the untreated cases. The statistics show very clearly, however, that syphilitics are very poor risks, and that so far as the Medical Director's judgment goes, it is impossible to select them with any degree of safety. Some of the companies, however, still accept what are judged to be the best of the risks and offer short endowments maturing on or before the age of fifty. But even on these plans, they are very poor border-line risks.

From the agent's viewpoint, it must be remembered that applicants are sometimes in doubt as to whether or not they have had syphilis. These doubtful cases have been investigated and their mortality is given as 138%. There is a veneral disease known as chanroid or soft chancre, that presents at times difficulty in differentiating from true syphilitic chancre. A chancroid is not followed by any constitutional symptoms; it is a purely local infection and it should not be counted as an impairment against the applicant. Only a statement from the attending physician can clear up the matter in these cases.

CHAPTER XVI

CONSTITUTIONAL DISEASES

DIABETES MELLITUS

DIABETES mellitus is a constitutional disease, characterized by the presence of sugar in the urine. The scientific name for sugar in the urine is glycosuria. The sugar that is found in the urine is not ordinary cane sugar, but a variety known as glucose. It will be necessary to explain certain facts involving the chemistry of foods, before attempting to discuss glycosuria.

Our food consists of five classes of chemical substances:

(1) Water.

(2) Salts.

(3) Proteins or albumens, which occur principally in meats, fish and eggs.

(4) Fats, which are chiefly in butter, oils, milk, cream, cheeses and the fats of meats.

(5) Carbohydrates, which comprise the starchy and sugary elements and occur principally in grain products (wheat, rye, barley, etc.), sugar, honey, potatoes, vegetables and fruits. The grain products include, of course, all articles of diet made from grains, such as bread, cakes, mush, etc.

The carbohydrates are changed to glucose during the process of digestion. The glucose is absorbed into the blood and is used by the body as fuel. Just as it is necessary to use gasoline to run an automobile or to burn coal to drive an engine, so is glucose burned up in the body and yields muscular energy and body heat. Since the body cannot use up glucose quite as rapidly as it is absorbed, it is stored away in the liver and muscles in the form of glycogen (which is a starch-like substance) and some of it is changed to fat, which is packed away under the skin, etc. When the amount of glucose in the blood exceeds about 1-10 percent, the kidneys will throw off (excrete) the excess of glucose, which thereupon appears in the urine and consti-

tutes glycosuria. This is a sort of safety valve action, because too much sugar in the blood would probably damage the delicate tissues of the body.

When sugar is found in the urine, it does not necessarily indicate diabetes. It may mean that glucose is being absorbed into the blood so fast that the body cannot store it up properly. The kidneys, under these conditions, throw it away in the urine. This is called dietetic or alimentary glycosuria, and is seen particularly in persons who eat about one-half pound of candy at one sitting.

Glycosuria may also result from excitement or emotional conditions. Whenever a person gets thoroughly angry, the nervous system causes the liver to unload some of its stored-up sugar into the blood, so that, if a person should decide to fight, his blood will be properly charged with glucose, which furnishes the energy for the fight. This action of the nervous system is like priming the carburetor of an automobile in order to get a rich mixture into the cylinders. Nowadays, we rarely fight, so that the excess of sugar in the blood is likely to be thrown away by the kidneys into the urine. This is known as neurotic glycosuria.

In true diabetes, for reasons not clearly understood, the body either fails to store up the glucose or fails to burn it up. As a result, it accumulates in the blood and the kidneys excrete it. The disease may last for years, especially in older persons, but persons with true diabetes have a very low vitality; they succumb easily to tuberculosis and pneumonia and are liable to lapse quite suddenly into diabetic coma—a condition in which the patient becomes unconscious. Diabetic coma is usually fatal.

While it is evident that sugar in the urine does not always mean true diabetes, nevertheless, persons who frequently have alimentary or nervous glycosuria are unquestionably very prone to develop real diabetes. From the insurance standpoint, glycosuria is of a great deal of importance, because sugar is frequently found by medical examiners and it is probable that in only a small percentage of cases does it indicate true diabetes. Without very careful study, it is not easy for a doctor to decide in the very early stages of real diabetes, whether or not he is dealing with the true disease, or merely with alimentary or nervous glycosuria. Sugar appears as a rule intermittently in the urine in the first stages of diabetes. The urine is sometimes perfectly free from sugar for quite a while and then, without

any clearly assignable reason, may show a considerable amount. After the disease is once well developed, the sugar is constantly present, unless, of course, the patient is under strict treatment.

The practice of insurance companies differs in handling the cases of glycosuria; some postpone the cases outright for three months or longer; others test additional samples of urine, and if these are found normal, approve the risk at once for small amounts or limited plans; other companies require the glucose test. This test is performed by having the applicant take 100 grammes (3 1-3 ounces) of pure glucose, dissolved in a pint of water, made more palatable with lemon juice. The urine voided two or three hours later is then tested for sugar. A normal person will not show a glycosuria after taking the glucose, but a diabetic will.

Sometimes an applicant, knowing that he has a slight diabetes, that can be controlled by restriction of the diet, will make an effort to obtain insurance in the hopes that nothing abnormal will be found on urinalysis. Fortunately for the insurance company, there are urinary tests whereby it is usually possible to detect such fraudulent attempts. It is, of course, an unwise procedure for an agent to connive at such practice, because, if detected, it shakes the confidence of the medical director in the agent's work and the agent is likely to suffer on account of it in future doubtful cases. One of the greatest assets that an agent possesses is the faith reposed in him by the home office officials.

The medico-actuarial investigation of persons who had a glycosuria on examination and in whom several specimens were subsequently found normal, showed a mortality of 95 percent. In spite of rigid selection, the death rate from diabetes was fully six times as great as the normal. Where sugar was found oftener than once, the mortality was about 200 percent.

Insurance agents must expect rigid selection among applicants showing this impairment. It is always well, where examiner reports sugar in the urine, to have the examiner send some of the same urine to his home office laboratory. The glucose tests are sometimes difficult to interpret, especially where the amount in the urine is small—1-3 percent or less. The more refined methods employed by the home office laboratory not infrequently demonstrate that sugar is not present in samples reported positive by the examiner.

Glycosuria of the dietetic type is also frequently encountered around the Christmas and New Year holidays, for the reason that persons are very prone at this season of the year to eat too freely of candies, dates, sweet cakes, etc. A word of warning to a prospect with reference to this may prevent complications.

It is not fair to an applicant to have him examined shortly after he has undergone some severe nervous strain. This is likely not only to produce a temporary nervous glycosuria, but, as explained in previous articles, is the cause occasionally of albuminuria, irregular or rapid pulse, high blood pressure, etc.

CHAPTER XVII

RHEUMATISM

RHEUMATISM is a disease characterized by a painful swelling of the joints. In a typical attack of articular (joint) rheumatism, there is considerable fever and the large joints, such as the wrist, ankle, the shoulder, elbow, knee and hip, are most likely to be affected. The disease is undoubtedly due to a germ, and this germ probably enters the system through the tonsils, since tonsillitis is very frequently associated.

The disease does not of itself often cause death; the dangers lie chiefly in its complications. It has a marked tendency to produce an inflammation of the inner lining membrane of the heart (endocarditis), as a consequence of which the valves of the heart become thickened, shrunken or adherent, so that insufficiency or stenosis of the valves of the heart (particularly the mitral valves) ensues. Other complications, such as chorea, pleurisy, pericarditis, acute Bright's disease, are less frequent. Articular rheumatism frequently recurs and persons subject to it may have repeated attacks.

There are evidently several different varieties of articular rheumatism. Besides the one described, rheumatism may be due to gonorrhoea, and it not infrequently develops in connection with scarlet fever, meningitis, typhoid fever, etc.

The more chronic forms of rheumatism that affect particularly only one joint, appear to be associated with nose infections, abscesses about the teeth, gall bladder, etc., or with syphilis, gout or other constitutional diseases. Articular rheumatism must not be confused with muscular rheumatism. Muscular rheumatism affects the muscles, particularly of the back or the neck, and results often from muscular over-exertion. It has little or no tendency to be followed by heart complications.

Articular rheumatism is frequently encountered as an impairment in connection with insurance examinations, and the medico-actuarial investigation furnishes interesting figures.

Where the applicant gives a history of one attack within two years of date of examination, the mortality was 120 percent. Where the attack was between two and five years, the death rate was 121 percent, while one attack more than five years prior to application was 109 percent.

Medical directors view risks giving a history of articular rheumatism as distinctively borderline, and postpone them for periods from one to five years after the attack—the length of the postponement period depending upon the severity of the disease and the number of attacks. It is decidedly risky to issue to these cases within a year from the date of the disease, because evidences of serious heart involvement may not be manifest until a year has elapsed. More liberal consideration is generally given these cases, if examined by physicians in whom the medical director has faith, because only the more skilled examiners are really expert in detecting heart murmurs.

Occasionally an injustice is done an applicant, because he states he has had articular rheumatism, when in reality he was suffering from only muscular rheumatism. If the applicant has any doubt as to the exact condition, it is well for an agent to have submitted with the application, a statement from the family physician, giving the exact diagnosis.

GOUT

Gout is a disease in which, for some unknown reason, uric acid accumulates in the body. Our food consists of carbohydrates, fats, salts, water and proteids. The proteids are derived principally from the meat that we eat, although some proteids are found in grains and vegetables. The proteids are highly complex chemical substances, and there are a great many different varieties of them. One of these varieties is known as nucleo-proteid. Nucleo-proteid occurs especially in such articles of food as sweetbreads, liver, kidney, brain. Ordinary meats (which are mostly muscle) also contain some nucleo-proteids. Nucleo-proteids are also found in the tissues of the body, where they enter into the composition of the liver, spleen, kidneys, etc. During the process of digestion, and also through the wear and tear of our tissues, the nucleo-proteids are split up into nuclein and simpler proteids. The nuclein is further split up into a substance called uric acid.

The uric acid is a waste-product and under normal conditions it is thrown away through the kidneys as rapidly as

it is formed. But in gout, for some unknown cause, the uric acid has a tendency to accumulate in the body and to be deposited especially about the joints and cartilages. This gives rise to considerable pain, which is popularly known as gouty rheumatism. But the real dangers of gout arise in connection with the fact that hardening of the arteries, Bright's disease and heart disease frequently develop as a complication, and cancer appears to be more frequent among gouty persons.

From the insurance standpoint, gout is a very serious impairment. The medico-actuarial studies give a mortality of 172 percent, where one attack has occurred within ten years of application; and where there were two or more attacks, the last one within five years of application, the death rate was 190 percent. The experience in the early years of insurance and at younger ages is not quite so unfavorable. Very few companies issue to these risks, and then usually they are limited to short endowments, that mature at the age of fifty or sixty. But even on endowment forms, they are very poor borderline cases.

There are, however, certain facts that the medical director must bear in mind in acting on applicants giving a history of gout. The average layman has an idea that all forms of rheumatism—both articular and muscular—are due to gout. Quack advertisements encourage this misconception. Furthermore, to be gouty is considered by some a guarantee of aristocratic ancestry. To complicate matters, there was a school of doctors that flourished some ten years ago, who diagnosed pretty nearly every disease as "uric acid diathesis." The lithia tablet industry flourished in consequence.

For these reasons, it is not always easy for a medical director, where an applicant states he had "uric acid diathesis" or 'gouty rheumatism," to separate the wheat from the chaff. A statement from the physician who treated the applicant, giving full particulars of data on which he based his diagnosis, is of great help in selecting these cases and insures greater justice in the final ruling.

CHAPTER XVIII

MALARIA

MALARIA is a disease caused by a parasite (plasmodium malariae), which develops in the blood. It is transmitted by a certain species of mosquito (anopheles) who act as intermediate hosts. An intermediate host is an insect or animal that carries the infection from one person to a second person—the parasite undergoing certain necessary developmental changes in the intermediate host before being ripe for inoculation into the second person.

There are several varieties of malaria: (1) The regularly intermittent fevers accompanied by chills, fevers and sweats every forty-eight or seventy-two hours; (2) The irregular remittent or continued fevers, that run a course resembling somewhat typhoid fever; (3) The pernicious forms that are very fatal and are associated with coma, collapse or hemorrhage, especially from the kidney; (4) The chronic form, characterized by a very irregular course of fevers, sweats jaundice, anemia and enlarged spleen.

The first two forms are usually promptly cured by quinine. The pernicious form is more refractory to treatment. The chronic form results from repeated inoculations or neglect of proper treatment of the other forms. The victims of chronic malaria are always in poor health. They have a low resistance and are very prone to succumb to intercurrent affections, such as pneumonia, typhoid or tuberculosis.

Malaria has an important bearing on insurance matters. Certain of our southern states—Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi and Texas—have a mortality rate higher than the northern states, owing principally to the prevalence of malaria in the south. It is probable that if these southern sections of the country could stamp out the malarial mosquitos, the death rate would be lower than in the northern sections.

Viewed as an insurance impairment, malaria shows variations in the death rate, depending principally on the section

of the country in which the applicant lives, the time elapsed since the last attack, the number of attacks and the variety of malaria. Thus, in some of the southern states, the mortality ratio, for applicants giving a history of one attack of intermittent or remittent fevers within two years, was as high as 170 percent., whereas, in the northern states, the death rate was practically normal. Attacks occurring later than two years from date of application in the southern states showed a slightly less unfavorable mortality. Very few companies will issue to applicants giving a history of pernicious malaria, unless at least five years have elapsed since the attack. Persons suffering from chronic malaria are not insurable.

It is of some interest to note that there appears to be a steady improvement in the death rate in the south, due no doubt to the awakening of this section of the country to the menace of mosquitos and malaria.

CHAPTER XIX

DIGESTIVE ORGANS

Diseases of Stomach and Intestines

Indigestion, Dyspepsia and Biliousness

INDIGESTION, dyspepsia and biliousness are really not distinct diseases, but are merely symptoms. Everybody at times suffers from slight attacks as a result of indiscretions in diet, nerve strain or constipation, and of course, when occurring from these causes, dyspepsia is of no moment. But persistent dyspepsia or indigestion is often a manifestation of grave internal disorder. Thus one of the earliest symptoms of tuberculosis in young slender persons is difficulty in digesting the food. Then again, the digestive disturbance may be entirely reflex and really dependent on such causative factors as gall-stones, appendicitis, cirrhosis of the liver, anemia, stone in the kidney, or in women, diseases of the womb. At ages past fifty and in persons with weak hearts, indigestion often develops from poor circulation and is likely to be so pronounced that the real cause—namely, the weak heart—is overlooked, even by skillful physicians. These persons often die suddenly from so-called "acute indigestion," when, in truth, the cause of death is heart failure. Where no defect exists outside of the stomach to account for chronic indigestion, there is always a suspicion that the trouble is due to ulcer of the stomach in young persons, or cancer of the stomach in older applicants.

You can readily appreciate from this description how careful and circumspect the medical director must be in handling these cases.

No special study of the subject of dyspepsia was made in the recent Medico-Actuarial Investigation, but in the Specialized Investigation of the Actuarial Society of America, published in 1903, applicants with a history of dyspepsia gave a favorable mortality, unquestionably due to the fact that these cases were carefully selected after a thorough investigation.

Agents must expect, whenever an applicant states that he has had indigestion or dyspepsia within recent years, to receive notices from the medical director calling for further details. It is especially on these risks that agents can assist the medical director by having the applicant submit a statement, signed by the attending physician, giving the exact diagnosis and cause and indicating that serious causative factors, such as ulcer of the stomach, gall-stones, tuberculosis, appendicitis, etc., were carefully excluded.

Ulcer of the Stomach

In young anemic girls or in persons afflicted with heart disease, or in those who suffer from "sour stomach" or chronic indigestion, there frequently develops near the outlet of the stomach (pylorus) or in the first part of the small intestine (duodenum) an ulcer that receives the name of gastric, pyloric or duodenal ulcer. These ulcers give rise to considerable pain and are associated with acid dyspepsia. There is always danger that the ulcerative process may cause death through perforating the wall of the stomach, resulting in peritonitis, or that they may erode into some large artery, producing a dangerous and sometimes fatal hemorrhage (hematemesis). They are very resistant to treatment and are very prone, when they do heal, to leave large scars in the stomach wall, on the site of which in later years cancer is likely to develop.

Our exact knowledge concerning this impairment from the insurance viewpoint is not very extensive, because very few standard companies accept risks giving a clear history of gastric ulcer. The Medico-Actuarial Investigation gives figures for only 178 applicants among whom there were 11 deaths; only 9 deaths were expected by the M. A. Tables. The fact that there were available so few cases for investigation indicates that the applicants that were accepted were selected with great care, because the impairment is frequently encountered in insurance work.

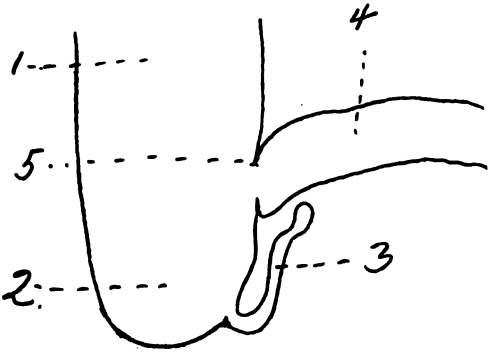
There is no doubt that applicants with a history of gastric ulcer should be viewed as distinctly sub-standard cases; but where more than five years have elapsed since the attack, and where the risk is otherwise gilt-edge, some standard companies issue policies—but usually on the endowment forms, that will mature before the age that cancer is likely to develop. Cancer of the stomach is rather common after the age of fifty.

Medical directors are always wary of cases giving a history of prolonged indigestion, because these risks are likely to be suffering from gastric ulcer. As suggested under the article on indigestion, the agent can assist the medical department by having the applicant submit to his company a statement from the attending physician, giving full details and exact diagnosis.

CHAPTER XX

APPENDICITIS

APPENDICITIS is a disease due to an inflammation of the vermiform appendix—a narrow, worm-shaped tube, averaging about three inches in length. It is located behind the large intestine (colon), from the lower end (caecum) of which it usually curls upward, as shown in the schematic illustration.



1—Large Intestine (Colon). 2—Caecum. 3—Appendix Vermiformis. 4—Small Intestine (ileum). 5—Valve at opening of small intestine into large intestine (ileo-caecal valve).

Appendicitis is a dangerous malady on account of the complications that are likely to ensue. When the appendix becomes inflamed, it distends and is very prone to rupture, whereupon the pus and intestinal contents are discharged into the peritoneal cavity, producing a fatal peritonitis. The peritoneal cavity is the space inside the abdomen, in which lie suspended the abdominal organs—stomach, intestines, liver, spleen, etc.

The milder forms of appendicitis usually subside without requiring operative interference, but there is always in

these patients the danger of recurrence and subsequent attacks are usually more serious than the primary one.

The results of the Medico-Actuarial Investigation are not strictly in harmony with what is known to be true of this impairment from the clinical medical standpoint.

Unquestionably, persons with one attack of appendicitis, on whom a successful operation for removal of the appendix has not been performed, are constantly in danger of a recurrence for at least two or three years after the attack. Notwithstanding this fact, the figures given by the Medico-Actuarial Investigation give a mortality of only 90 percent, where the attack has occurred without operation, within two years of application. The material for study was small and no doubt a most rigid selection was exercised, which is further corroborated by the figures given for applicants giving a history of one attack without operation, between two and five years prior to application—namely, 103 percent. The cause of death among the cases studied, due to appendicitis, was three times the normal death-rate from this disease.

It is the practice of most companies issuing standard insurance to postpone these applicants from one to five years, depending on the severity, duration and variety of the appendicitis, and then they are very carefully selected.

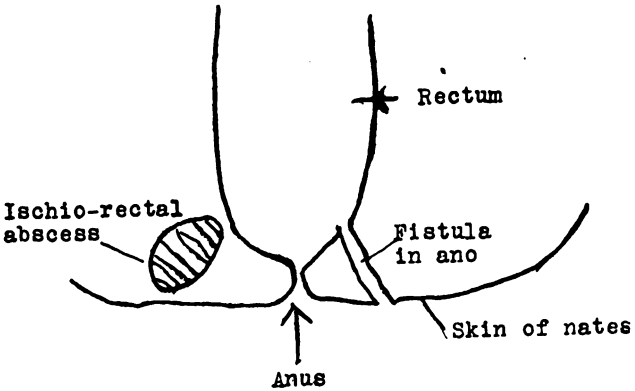
Since very many cases of "stomach-ache" or "cramp colic" are in reality, especially in younger persons, due to appendicitis, agents must not lose patience if medical directors insist on a thorough investigation of all cases giving a vague history of abdominal pain. Statements, indicating the exact cause and diagnosis, from the attending physician, are generally desirable and should accompany the application when submitted to the medical department.

CHAPTER XXI

FISTULA IN ANO

A FISTULA in ano is a condition, in which as a result usually of an ischio-rectal abscess, a channel is formed, which runs from the rectum to the skin outside of the anus. Ischio-rectal abscesses form generally as a result of injury or from infection from the rectum. They occur particularly in very stout or in very thin persons. In thin persons they are frequently associated with tuberculosis of the lungs. Ischio-rectal abscesses have a tendency, unless promptly treated, to discharge both into the rectum and on the skin surface of the nates and thus form the fistulous tract. A fistula rarely heals spontaneously; an operation is nearly always necessary for a permanent cure.

The following illustration shows more clearly this relationship.



Medical directors always view a history of fistula in ano in a lightweight as a strong evidence of tuberculosis, and the risk is usually declined for standard insurance for one to five years, depending on the degree of underweight, etc. In heavyweights, a fistula in itself is probably of little moment, provided it has been cured by an operation.

The medico-actuarial investigations are of interest and in harmony with our medical knowledge.

One attack of fistula in ano, with or without operation, within two years of application, shows a mortality of 120 percent. One attack within two to five years prior to application shows 136 percent, and one attack between five and ten years, 100 percent. On investigating the impairment in connection with heavyweight, the death rate was practically the same as that of the heavyweight impairment alone. But when studied in connection with lightweights, the ratio was 134 percent—far in excess of that expected, on account of the lightweight feature, and tuberculosis was the cause of death in an unduly large proportion of the cases.

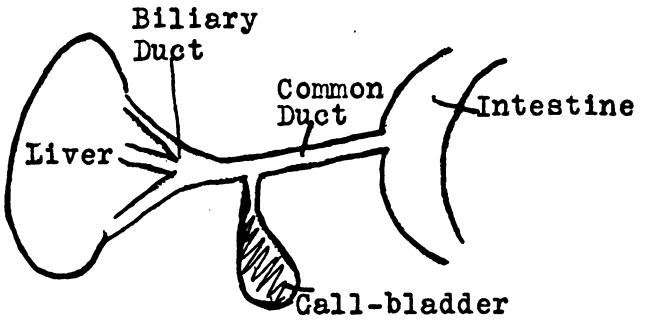
Agents must expect a very rigid selection among their applicants who are light-weight and give a history of fistula in ano. It is a point worth remembering, however, that many persons who have only slight hemorrhoids or have had an anal ulcer (fissure in ano), incorrectly diagnose their condition as a fistula. A careful examination will usually establish the correct diagnosis.

CHAPTER XXII

GALLSTONES OR BILIARY COLIC

ONE of the functions of the liver is to manufacture bile. Bile is a sticky, yellowish, bitter fluid that is carried from the liver through tubes known as the bile-passages and is discharged into the small intestines. Bile serves the purpose partly of assisting intestinal digestion and partly of carrying off from the liver certain waste-products that are later excreted with the stools.

The following schematic illustration of the bile-passages will be of assistance in discussing the formation of gall-stones:



Bile contains a great variety of chemical substances in solution. One of these, known as cholesterin, is particularly prone to be precipitated and when this occurs, the precipitated cholesterin, which is a hard waxlike substance, forms gall-stones. They may be formed either in the gall-bladder or in the biliary or in the common duct. They vary in size from a pin-head to a walnut and may be single, but are more often numerous, several hundred being not uncommon.

Women, especially those overweight and past the age of forty, who suffer from constipation or biliousness, are oftenest the sufferers; but, of course, the disease occurs in men.

Some doctors believe that certain germs—notably typhoid germs—infecting the gall-passages are the cause.

Gall-stones give rise to considerable pain, which is likely to recur at intervals and to be of a colicky nature. The pain is due either to an inflammation of the gall-bladder or to a spasmodic contraction of the biliary or common ducts, in an effort on the part of these ducts to expel the stones into the intestines. Jaundice, or a yellow discoloration of the skin, may or may not accompany the attacks. The dangers of gallstones are a perforation of the gall-passages by the stones, or an infection of the liver from the damming back of the bile, or, later in life, from the irritation of the stones, cancer may develop. Many persons having gallstones suffer principally from dyspepsia and are unaware of the real cause of their misery.

Applicants for insurance giving a history of gallstone colic or inflammation of the gall-bladder (cholecystitis) resulting from gallstones, are very poor risks, especially where the attack has occurred within the past five years. Recurrences are common and permanent cure is rare, except through a rather serious surgical operation.

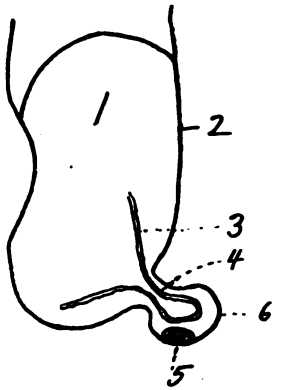
From the clinical experience, physicians generally assume that, if there has been no trouble for five years, the patient is comparatively safe, and in harmony with this view, most insurance companies issuing only standard insurance, have accepted these applicants, if five years have elapsed since a single attack. But the Medico-Actuarial Investigation would indicate that this ruling is too liberal. Irrespective of the date of a single attack, the mortality was 130 percent; while two or more attacks gave a mortality of 195 percent. Unfortunately, the data were not sufficiently numerous to justify positive conclusions.

The agent must expect very rigid selection among these cases. They are probably really sub-standard. There is just one point that merits some consideration. Some persons, as a result of overeating, become bilious and have pains resulting from the indigestion. The popular name for this, especially in the South, is "bilious colic." It really bears no relation to gallstones. Medical directors generally assume that these cases are true biliary colic and place the burden of proof on the applicant. A statement from the attending physician helps in these cases. That the medical directors are justified in this attitude is shown by the figures

given by the Medico-Actuarial Investigation for "bilious colic." The mortality was 128 percent—practically the same as true gallstones or biliary colic.

CHAPTER XXIII

HERNIA OR RUPTURE



Schematic Illustration of Inguinal Hernia

1—Abdominal Cavity.
2—Abdominal Wall.
3—Loop of intestine, escaping through Inguinal Canal.
4—Inguinal Canal.
5—Testicle.
6—Scrotum.

A HERNIA or rupture is a swelling that results from the protrusion of the contents of a cavity (usually the abdominal) through an abnormal opening in the walls of the cavity.

The commonest variety is an inguinal hernia, that appears in the groin and scrotum. Hernia is frequent in this locality, because the testicle is really an abdominal organ. Before birth the testicle is developed in the abdominal cavity, but about a month before birth it descends, piercing the wall of the abdomen in the groin, and drops into the scrotum. The place where it pierces the abdominal wall is called the

inguinal canal. This canal usually closes quite firmly, but it is never as strong as the rest of the wall. Over-exertion or injury is likely to result in reopening the passage, in which case the intestines descend through the canal into the scrotum, constituting an inguinal or scrotal hernia. The schematic illustration may make this description clearer.

Usually by applying upward pressure against the intestine, it may be forced back into the abdominal cavity and retained there by a proper truss. When this can be done, it is called a reducible hernia. Occasionally the intestines become adherent to the inside of the scrotum or form a tangled mass, making it impossible to push it back; this is known as irreducible hernia. The inguinal canal is rather narrow, so that there is always considerable danger that the circulation through the protruded intestines may become choked off in this passage. When this occurs, it is known as strangulated hernia. Strangulated hernia, unless promptly relieved, results in gangrene of the bowel, peritonitis and death.

Hernias are of frequent occurrence, but where the hernia is small and reducible and well-retained by a truss, it is not considered an impairment calling for declination or even limitation. Applicants who have a hernia, but who do not wear a truss, are not viewed so favorably, the size of the rupture and the occupation, etc., of the risk, determining the decision of the medical director. Irreducible hernias, on the other hand, being more liable to strangulation, are not as a rule accepted for standard insurance. The medico-actuarial investigation gives a mortality of 92 percent for hernia, where a truss is worn, and 116 percent where no truss or support is used.

It is of importance for the insurance agent to know that applicants who do not wear a truss receive more favorable consideration, if they will procure one and promise to wear it. The failure to do so is due in many cases to ignorance or neglect.

CHAPTER XXIV

DISEASES OF THE NERVOUS SYSTEM

NEURASTHENIA

NEURASTHENIA or nervous prostration is a condition in which the nervous system becomes easily exhausted, so that it fails to respond normally to the ordinary demands made upon it.

The symptoms of nervousness or neurasthenia vary greatly in different persons. As a rule, the commonest complaints are irritability of temper, sleeplessness, moroseness, melancholia, a tendency to magnify small troubles and to worry about one's health; there is an inability to concentrate the mind on mental tasks, readily induced mental fatigue, sensitiveness to criticism, certain feelings of apprehension, a presentiment that something terrible is about to happen. Some persons have vague fears or phobias—they are afraid to be left alone or to mingle with a crowd, or to cross a street, etc., and innumerable superstitions obsess them and govern their actions. Associated with these symptoms there are often nervous dyspepsia, capricious appetite, palpitation of the heart, rapid pulse, nervous cough, irritability of the bladder, nervous twitching of the face or hand, or tremors, dizziness or headaches.

Neurasthenia is due to a variety of causes. Unquestionably heredity plays an important part—we resemble our parents in temperament and disposition, as well as in physical appearance. But the ailment more often arises from an exhaustion of reserve nervous force, resulting from prolonged worry or anxiety or grief, business responsibilities or reverses, family troubles, or ambition to excel socially or financially or professionally, uncontrolled emotions of envy, jealousy and hatred, exhausting mental efforts. Dissipation, alcoholism, excessive use of tobacco, coffee or tea are often contributing factors. In some persons, morbid regrets and worry over past moral infractions, especially in sexual matters, are a cause. Sometimes it is seen in persons who,

having no occupation to absorb their thoughts and energies, turn their minds upon themselves introspectively.

While neurasthenia is usually due to conditions already described, there is more rarely an organic basis for it. Young thin persons, who have a slight tubercular infection, are very prone to ascribe their reduced vitality to "nervousness." Past the age of forty, men with syphilis or high blood pressure and beginning hardening of the arteries often have symptoms closely resembling those of neurasthenia. Any disease of the sexual organs—prostatitis in men, uterine or ovarian troubles in women—have a tendency to cause nervousness. More rarely, symptoms of neurasthenia will precede or accompany such diseases as exophthalmic goitre, anemia, diabetes, etc. Nervousness, too, may result from bad teeth, impaired vision, prolonged neuralgias, or any disease or disorder or occupation that chronically irritates the patient.

Not infrequently, persons who have suffered from actual mental unbalance or insanity attempt to disguise the real facts by giving neurasthenia as the diagnosis.

Neurasthenia is an impairment frequently encountered in insurance examinations and it always calls for careful investigation on the part of the medical director. Where an organic basis can be ruled out as a cause, a history of neurasthenia, unless very severe or recent, should not decline or limit the risk. The medico-actuarial investigation gives a mortality of 119 percent for one attack within two years, and 105 percent for one attack between two and five years prior to application. The relatively favorable mortality was no doubt obtained only through careful selection.

Agents must be patient if their medical director insists on thorough inspection and investigation of these cases. A statement by the attending physician and perfectly frank statements on the part of the applicant help materially in selecting the desirable cases.

CHAPTER XXV

SPECIFIC DISORDERS

Apoplexy

APOPLEXY or Paralytic Stroke results either from a rupture or from a plugging up of one of the blood-vessels in the brain. The commonest underlying cause is arterio-sclerosis, or hardening of the arteries of the brain, which either so weakens the artery that it bursts, or so roughens the inside of the artery that the blood clots therein. In consequence, a certain portion of the brain is either destroyed by the blood that escapes from the artery or dies because the nourishing blood cannot reach it. Curiously enough, this happens most frequently in a locality (internal capsule of the brain), where the nerves running from the brain to the spinal cord and thence to the muscles of the body, are gathered together in a small area, so that a hemorrhage no larger than a hazelnut may paralyze one-half of the body (half of the face, one arm and one leg).

Since the underlying cause of apoplexy is arterio-sclerosis and since the arterio-sclerosis has a tendency to be inherited, it is not unusual for several members of a family to die of apoplexy.

Persons who have suffered apoplectic strokes rarely recover full use of the paralyzed limbs, and recurrences of an attack are the rule. In consequence, applicants giving this history are not insurable.

A risk who gives a record of two or more cases of apoplexy or paralysis in the family history is distinctly a borderline case. The Medico-Actuarial Investigation shows a mortality of 108 percent. The death rate among these policyholders from apoplexy and paralysis was about twice the normal.

Some companies accept risks with family records of apoplexy on endowments to mature at the age of sixty or thereabout; others will issue on any plan, but only after rigid selection, especially as regards blood-pressure, urinalysis and overweight.

Agents should not write applicants who have suffered from apoplexy, and they must expect to have risks with a family history of apoplexy treated very conservatively by the Medical Director.

On the other hand, just because a prospect has a paralyzed arm or leg, is not a proof that he has suffered from a paralytic stroke. Infantile paralysis sometimes causes a deformity that to the inexperienced observer may simulate apoplectic paralysis. Applicants who have suffered from infantile paralysis are acceptable risks under certain conditions.

Locomotor Ataxia (Tabes Dorsalis)

Paresis (Progressive Paralysis of the Insane)

LOCOMOTOR Ataxia and Paresis are diseases that are now recognized as being due to syphilis. Both are characterized by a degeneration or a dying-off of certain portions of the spinal cord or brain. In Locomotor Ataxia the spinal cord is affected; in Paresis the brain is involved. In many cases both diseases co-exist.

It is generally estimated that about five percent of all persons who have had syphilis develop one or the other of these affections. The fact that the patient was thoroughly treated does not seem to protect against the development of Locomotor Ataxia or Paresis later in life. Generally from ten to twenty years intervene between the infection of syphilis and the onset of these diseases, but the time interval may be as long as thirty years or more.

As a rule for several years preceding the gross manifestations of these diseases, certain definite evidences can be detected on examination. In the case of Locomotor Ataxia, the knee reflexes are abolished and in Paresis the pupillary reflexes are altered. The knee reflex is elicited by tapping the tendon below the knee cap (patella tendon) while the applicant crosses his legs and relaxes the thigh muscles. An instant involuntary extension of the leg results under normal conditions. The eye reflexes are tested, roughly, by throwing a beam of light from a burning match or electric torch into one eye. Normally the pupil of the eye will contract or grow narrower. Failure of the pupil to react in this way is abnormal.

If either of these signs is present and other evidences of syphilis are discovered, the risk is certainly not insurable. However, since about one percent of all non-syphilitic persons fail to give normal knee jerks, it is not fair to the applicant to decline for this reason alone, although it should form the basis for a more careful examination for suspected syphilis and locomotor ataxia. Failure of the eye-pupils to contract to light is so rare in non-syphilitic normal persons, except where an eye is blind or diseased, that most medical directors hesitate to issue to these risks at all.

Infantile Paralysis (Anterior Polio-Myelitis)

Infantile Paralysis is an infectious, contagious disease that affects particularly children. The virus attacks the spinal cord, destroying certain portions of it, with the result that paralysis of the muscles develop. The paralysis may be very extensive, but as a rule it is limited to only a few muscles of the arm or leg. The deformity is usually permanent and is of the type known in medicine as the flaccid or flail; that is, the paralyzed arm or leg is limp, without any suggestion of rigidity. The paralysis, on the other hand, that is produced by apoplexy, is spastic, the affected parts appearing stiff, rigid and taut. This difference in appearance may be of assistance in helping an agent distinguish between the forms of paralysis.

The Medico-Actuarial Investigation gives a mortality of 105 percent for applicants with infantile paralysis. This experience, of course, puts them in the borderline class; but so long as the deformity is not extreme, and provided, too, they are otherwise good risks, there is no reason why they should not be eligible for standard insurance.

Vertigo or Dizziness

Vertigo or dizziness or giddiness is not a distinct disease. It is a symptom which is noted in connection with a great variety of different diseases and disorders. The attacks may be only slight, in which case the patient suffers the sensation of spots before the eyes, swaying of objects in his field of vision, slight nausea and a feeling of impending unconsciousness. If he is on his feet, he may lose his balance and stagger about or even fall. The attack is

usually of brief duration. In the severer attacks, vomiting is common and he is unable to stand or even to sit up, and the sensation may last for several minutes or even hours.

Vertigo occurs in connection with most of the diseases of the nervous system, especially with hardening of the arteries of the brain, with tumors, syphilis, injuries, inflammation and abscesses of the brain. It is sometimes an indication of a very mild form of epilepsy and is a common symptom of neurasthenia and nervousness. Diseases of organs other than the brain also cause it—such as ear or nose troubles, heart or kidney disease, high blood pressure. anemias, indigestion, constipation and diseases of the female organs. Acute diseases, such as tonsilitis, pneumonia, malaria, etc., especially those accompanied by high fever, are frequently ushered in by a feeling of vertigo. Persons very much run down in health, or who have suffered a severe hemorrhage, commonly complain of dizziness.

Almost everybody at some time or other has slight dizzy spells, especially on arising suddenly from a stooping posture. As a rule the attacks are due to trivial causes, notably indigestion, biliousness, constipation, eyestrain, nervousness, too much coffee, tea or tobacco, mental or physical overwork, or mild dissipation.

Vertigo is an impairment frequently noted in insurance work. If the attacks are recent or frequent, a thorough investigation is necessary before the eligibility of the risk can be determined.

We have no reliable statistics showing the mortality among applicants with this impairment. Every case must be judged on its individual merits. Agents must be patient if medical directors call for additional data or re-examination in these cases, because vertigo may at times be the sole indication of very serious disease.

CHAPTER XXVI

SPINAL CURVATURE

SPINAL curvature or "hunch-back" is a condition in which the bones of the spinal column become bent out of their natural position. There are three forms: A forward bend is known as lordosis; a backward bend is kyphosis; and a sideward bend, either to the right or left, is called scoliosis.

Lordosis or kyphosis is sometimes due to injury, but most often it follows tuberculosis of the bones of the spinal column and is then usually an angular deformity, i. e., the curve of the bend terminates in a peak. When due to tuberculosis of the bones, it is called Pott's disease of the spine. Applicants with Pott's disease are not eligible for standard insurance. In these cases, there is always danger of a generalization of the tubercular process; and furthermore, since the spinal cord is enclosed by the bony cylinder of the spinal column, there frequently develops a pressure on the spinal cord at the point of angular curvature, which may result in paralysis of the legs, bladder and rectum. The internal organs, too, of the chest and abdomen become displaced in consequence of the deformity and their functions may be seriously interfered with.

Scoliosis or lateral curvature develops as a result of bad habits in sitting or standing, or from underdevelopment or paralysis of the muscles that hold the spine in its proper position. It is nearly always non-angular; that is, the abnormal bend forms a gradual curve, without a peak or sharp point. It occurs especially in young, thin, poorly developed girls. Applicants with scoliosis are distinctly substandard. The Medico-Actuarial Investigation gives a mortality of 170 percent. However, where the deformity is not extreme, and where it has not grown worse during the last ten years, these risks are often accepted for standard insurance, but usually only on the endowment plans.

Agents should not submit applications on hunch-backs before first submitting to the medical director the full particulars of the deformity. The variety, location, extent, severity, duration of the deformity must all be taken into account before the eligibility of the risk can be determined.

CHAPTER XXVII

OTORRHOEA OR OTITIS MEDIA

OTORRHOEA is the technical term for a "running ear," where the discharge comes from the middle ear. The middle ear is that portion of the ear between the outer ear drum membrane and the inner ear drum membrane. In a general way, the middle ear somewhat resembles an ordinary drum, with a membrane on each side and an opening leading into the throat. Other communications also exist into a porous bone behind the ear (mastoid). When the middle ear fills up with pus, the outer membrane ruptures and a discharge (otorrhoea) is noticed coming from the ear. The condition often becomes chronic and there is some danger of the pus working into the mastoid, causing mastoiditis, and even of bursting into the brain, causing meningitis and brain abscess.

A single acute attack of otitis media often results from an ordinary cold, tonsilitis, or acute fevers. Sometimes it follows injury from blows on the head, swimming, etc. As a rule, an acute attack clears up in a week or ten days without complications. There is a liability to recurrence and often, after three or four of these, the condition does not clear up, but there remains a persistent, often offensive, discharge on account of a permanent rupture in the ear-drum.

Applicants with a history of a single acute attack, with full recovery, are good risks a few months after the attack. Those having repeated attacks are not so favorable; the degree of the impairment depending on the number, severity and duration and dates of the attacks. Those who have a profuse, offensive discharge are not eligible for standard insurance. It is the custom of some medical departments to request an examination of an ear specialist, in order to ascertain the exact nature of the ear trouble and especially of the existence of such complications, as bone or mastoid involvment.

The Medico-Actuarial Investigation gives a very favorable mortality for risks giving a history of a single attack. But

It has always been recognized in insurance selection, that a lack of longevity, as evidenced by the fact that both parents and all grandparents died before the age of sixty-five, must be taken into consideration in acting on applications. In the specialized mortality investigation, it was noted that policyholders, of standard weight, both of whose parents had died before the age of sixty, showed a death rate of 90 percent by the modified health mortality table, as compared to 79 percent among policyholders whose parents reached the age of seventy-five. The mortality in the first group was particularly high at ages past fifty-seven. The modern tendency is to attribute minor importance to the factor of lack of longevity among parents and grandparents, unless the premature deaths were due to diseases that have a tendency to be transmitted. It is known, for instance, that arterio-sclerosis, apoplexy, heart and kidney diseases, diabetes, insanity, run in families. Endowments maturing on or before the age of sixty or sixty-five are usually offered these risks.

Agents frequently encounter applicants who know very little of their family history. This ignorance is usually looked upon by the medical director (and perhaps properly so) as evidence that the parents and grandparents died at so early an age that the applicant fails to remember them at all. This occasionally leads to an injustice in applying the rules. It is well to remember that these applicants can often secure accurate data through the female members of the family—sisters or cousins. Women are more likely to remember data connected with the history of their families than are men.

CHAPTER XXIX

ALCOHOL

Alcohol is both a food and a poison. It is a food, in that, when taken into the body, it is burnt up and furnishes energy for muscular work and for body heat, just as do the sugars, starches and fats of our diet. It is a poison, in that it has a destructive action on the tissues (protoplasm) of the body. This is seen particularly in the way it affects the liver, causing a slow death (cirrhosis) of the liver cells. It is evidently, too, a poison in its action on the heart, blood vessels, kidneys and brain, as demonstrated by the fact that these organs commonly show pathological changes in heavy drinkers. From the moral standpoint, it is pernicious—men under the influence of liquor commit crimes, misdemeanors, sexual excesses, that they would not be guilty of, if sober. Finally, liquor is ordinarily indulged in under conditions that are not conducive to good health. The atmosphere of the average saloon, the late hours, etc., are not compatible with long life. There is no doubt that, on the average, the total abstainer lives longer than the immoderate drinker. In fact, it may be stated that alcohol shortens life in exact proportion to the amount consumed—with this possible reservation: That if a man is very moderate in its use, never drinks to excess, imbibes only in surroundings healthful from the hygienic and moral standpoint, it may be possible that alcohol has no ill effects.

From the insurance viewpoint, the question of alcoholic habits gives rise to many controversies between agents and medical directors. Applicants judge their own habits leniently—more in accordance with their prejudices on the subject than with the actual facts. The medical director is compelled often to fall back on reports of inspection companies, whose representatives, too, have difficulty in ascertaining the exact facts.

Applicants addicted to the use of alcohol may be divided into several classes:

(1) The steady, free user, who occasionally drinks to excess.

(2) The risk who indulges in sprees three or four times a year, but who is ordinarily a total abstainer in the intervals.

(3) The steady, free user, who rarely or never drinks to excess.

(4) The reformed alcoholic.

(5) The confirmed heavy drinker.

The medico-actuarial investigation statistics on this subject are interesting.

Applicants giving a history of occasional excesses showed a mortality varying from about 139 percent to 174 percent by the medico-actuarial table, depending upon the date of the last excess.

The steady, free users, without history of excessive use, offered difficulties in the way of investigation, because the term "steady free use" is susceptible of different interpretations. Those using on the average about one ounce of alcohol a day (two or three glasses of beer or one glass of whiskey) showed a death rate of 118 percent; in those using twice this average, the mortality was 186 percent.

Risks reformed, with or without "alcohol" cures, gave a ratio of about 133 percent, which varied, however, in accordance with the length of time elapsed since the reformation.

The confirmed heavy drinker or the habitual "spreer" is, of course, not insurable.

On account of the frequency with which the impairment of doubtful alcoholic habits is encountered and the difficulty of deciding its degree, most of the medical departments have no fixed rules in handling these cases. The applicants are judged more or less individually and the elements that enter into consideration are: The average amount consumed; the history of excesses or sprees; the length of reformation, if reformed; the duration of the habit; age of the risk, and occupation. The statement of agents and reports of inspection companies carry considerable weight. As a matter of fact, there are very few companies indeed who are not more liberal in their rulings regarding the use of alcohol, than either the medico-actuarial investigation or our medical knowl-

edge justifies. Applicants who drink moderately are really borderline cases, but since practically every company accepts them, the burden is borne pretty equally by all.

Agents should not submit applications on risks about whose habits there is some doubt, because these risks are not desirable. Just as one judges a man by the character of his friends, so does a medical director judge an agent by the risks he submits. If you are in doubt about a man's habits, it is always best, before submitting the application, to communicate with the medical department with a view of ascertaining the acceptability of the risk. A man of questionable habits resents a formal rejection as reflecting on his character, and not a few enemies are made by agents and insurance companies by tactless handling of these risks.

CHAPTER XXX

BUILD

THE height and weight are among the most important of the items that enter into consideration in selecting insurance risks. There are several tables, differing slightly from one another, which express the average weights for varying heights and ages. The one most frequently used at the present time is the table constructed by the Medico-Actuarial Investigation Committee. The table has been graded and gives the weight for each age. For practical purposes, however, it is more convenient to give the average weights for groups, including five consecutive ages, as shown in the following table for men and women.

Standard Height and Weight—Men

Ages / Height	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 and over
5 ft. 0 in.	111	119	124	127	129	132	134	135	135
5 ft. 1 in.	113	121	126	129	131	134	136	137	137
5 ft. 2 in.	116	124	128	131	133	136	138	139	139
5 ft. 3 in.	119	127	131	134	136	139	141	142	142
5 ft. 4 in.	122	131	134	137	140	142	144	145	145
5 ft. 5 in.	126	135	138	141	144	146	148	149	149
5 ft. 6 in.	130	139	142	145	148	150	152	153	153
5 ft. 7 in.	134	142	146	149	152	154	156	157	158
5 ft. 8 in.	138	146	150	154	157	159	161	162	163
5 ft. 9 in.	142	150	154	158	162	164	166	167	168
5 ft. 10 in.	146	154	158	163	167	169	171	172	173
5 ft. 11 in.	151	158	163	168	172	175	177	178	178
6 ft. 0 in.	156	163	169	174	178	181	183	184	184
6 ft. 1 in.	161	168	175	180	184	187	190	191	191
6 ft. 2 in.	166	173	181	186	191	194	197	198	198
6 ft. 3 in.	171	178	187	192	197	201	204	205	205
6 ft. 4 in.	176	183	192	198	203	208	211	212	212

Standard Height and Weight—Women

Ages / Height	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 and over
4 ft. 8 in.	103	107	110	113	116	120	123	125	125
4 ft. 9 in.	105	109	112	115	118	122	125	127	127
4 ft. 10 in.	107	111	114	117	120	124	127	129	129
4 ft. 11 in.	109	113	116	119	122	126	129	131	131
5 ft. 0 in.	111	115	118	121	124	128	131	133	133
5 ft. 1 in.	113	117	120	123	126	130	133	135	135
5 ft. 2 in.	116	120	122	125	129	133	136	138	138
5 ft. 3 in.	119	123	125	128	132	136	139	141	141
5 ft. 4 in.	122	126	129	132	136	139	142	144	144
5 ft. 5 in.	125	129	132	136	140	143	146	148	148
5 ft. 6 in.	129	133	136	140	144	147	151	152	153
5 ft. 7 in.	133	137	140	144	148	151	155	157	158
5 ft. 8 in.	137	141	144	148	152	155	159	162	163
5 ft. 9 in.	140	145	148	152	156	159	163	166	167
5 ft. 10 in.	144	149	152	155	159	162	166	170	171
5 ft. 11 in.	149	153	155	158	162	166	170	174	174
6 ft. 0 in.	154	157	159	162	165	169	173	177	177

It must be remembered that the standard weight given in the preceding tables represents the **average** weight. The average weight is not necessarily the most favorable weight. As a matter of fact, it is really only between the ages of 25 to 35 that the average weight shows the most favorable mortality.

The following tables give the best weight and the lowest safe and highest safe weights for corresponding ages and heights. It is based on the results of the insurance investigations, minor modifications having been introduced in order to harmonize the various groups. (For table see page 28.)

In a general way, it may be stated that underweights, especially all the younger ages, are particularly prone to die of tuberculosis. Resistance to tuberculosis is largely a matter of nutrition and poorly nourished persons are usually thin. Overweight, on the other hand, is a serious impairment past the age of forty. Stout persons die usually of heart or kidney disease, high blood pressure or apoplexy. This is partly due to their eating too much—a hygienic error

which overburdens the heart, arteries and kidneys by imposing on them additional work in assimilating the food and in disposing of its waste-products. But even where the overweight is not due to eating too much, harm is done, in that, since the heart and arteries and kidneys are designed to function for a body of only average weight, they are overworked in caring for a body that exceeds specifications. A small, light locomotive will soon break down if called upon constantly to haul a long train of heavily loaded cars.

The height, irrespective of the weight, appears to have considerable influence in determining expectancy of life. Tall men, over five feet, ten inches, are less likely than the average man to reach the age of thirty-five. They are particularly predisposed to tuberculosis. After the age of thirty-five, however, their prospects of long life constantly improve, provided they do not grow too heavy.

Men of medium height (five feet, seven inches, to five feet, ten inches) or those of low stature, five feet, no inches, to five feet, six inches, have good prospects of living to age thirty-five, if not too lightweight. Past this age their expectancy is less favorable, especially if their weights exceed the standard.

After the age of fifty, the thinner the risk, within reasonable limits, the better the chance of reaching a ripe old age. This statement postulates that the lightweight is not due to some organic disease or to the existence of a tubercular lesion.

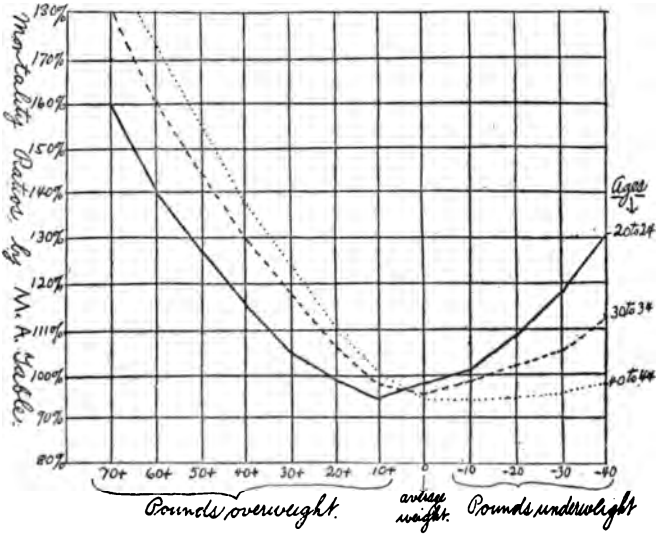
Unfortunately, nature throws obstacles in the way of a person's maintaining a favorable weight. It is, of course, the tendency for young persons to be light and for older persons to grow fat.

A sudden change of weight is of considerable significance in connection with insurance selection. Where this involves an increase, it is usually of no moment, unless the applicant is already too heavy; but a loss of weight, not due to a clearly assignable cause, signifies nearly always at the younger ages, a developing tuberculosis, and at the older ages, some serious organic trouble, notably internal cancer or cardio-renal disease.

It may be frankly stated that medical directors have not the courage of their convictions in acting upon applicants showing a marked deviation from the standard build. Most

of the companies very consistently decline the young lightweights—the general tendency being to decline such risks if they are more than twenty percent lightweight before the age of thirty or forty. Where there is a family history of tuberculosis, the selection is more rigid. After the age of fifty, lightweight, even when quite extreme, should not be a bar to accepting applicants. But most medical directors hesitate to accept cases beyond fifty in excess of thirty percent below the standard.

The rule of most companies regarding heavyweights is to limit or decline if the overweight is over twenty percent of the standard. Applicants heavier than this are either rated up or offered endowments to mature at ages sixty or fifty or less, depending upon the degree of overweight. For the younger ages, this is fairly logical, because overweights have good prospects of reaching middle age. But heavyweight past the age of forty is a very serious impairment and companies who issue standard insurance to applicants that are more than twenty pounds or about fifteen percent over the standard are really losing money through the ex-



cessive death rate. The rule of most medical departments is to accept cases up to twenty percent or about thirty pounds overweight.

The following table graphically illustrates the mortality experience for three age groups twenty to twenty-four, thirty to thirty-four and forty to forty-four. The mortality by the Medico-Actuarial Table is indicated by the horizontal lines with percentage to the left, while the number of pounds under or over the average is given by the vertical lines with the figures in pounds below. Thus, applicants at age of entry forty-two, who were forty pounds over the standard in weight, showed a mortality of about 137 percent by the Medico-Actuarial Table.

Agents are frequently disgruntled when the medical director declines a risk, because the applicant is a few pounds over or under weight. But it must be remembered that all companies are very liberal in their rulings and that medical directors would prefer to decline rather than approve applicants who come just within the limits of their rules. The reason that these borderline cases are accepted at all is because of competitive conditions among the companies and as an accommodation to the agent.

It is true that where a deviation of weight is a family characteristic, the risk is slightly better than is indicated by the statistics; but medical directors are not inclined to give much weight to this consideration, because almost invariably the agent and applicant plead this extenuating circumstance, in spite of the fact that a family tendency is the exception rather than the rule. The medical director must give his company the benefit of the doubt.

Most Favorable Weight Column—Men

Center column gives best weight; column to left, light weight limit; column to right, the heavy weight limit

Ages	20-24			25-29			30-34			35-39			40-44		
Height	Light	Best	Heavy	Light	Best	Heavy	Light	Best	Heavy	Light	Best	Heavy	Light	Best	Heavy
5 ft. 0 in.....	99	126	149	99	124	144	97	127	142	94	119	139	92	117	142
5 ft. 1 in.....	101	128	151	101	126	146	99	129	144	96	121	141	94	119	144
5 ft. 2 in.....	104	131	154	104	128	148	101	131	146	98	123	143	96	121	146
5 ft. 3 in.....	106	134	157	106	131	151	104	134	149	101	126	146	99	124	149
5 ft. 4 in.....	111	138	161	111	134	156	107	137	152	105	130	150	102	127	152
5 ft. 5 in.....	115	142	165	115	138	158	112	141	156	109	134	154	106	131	156
5 ft. 6 in.....	119	146	169	119	142	162	117	145	160	114	138	158	110	135	160
5 ft. 7 in.....	127	152	167	127	151	166	127	155	170	122	147	167	114	149	169
5 ft. 8 in.....	131	156	171	131	155	170	133	160	175	127	152	172	119	154	174
5 ft. 9 in.....	135	160	175	135	159	174	138	165	180	132	157	177	124	159	179
5 ft. 10 in.....	139	164	179	139	163	178	143	170	185	137	162	182	129	164	184
5 ft. 11 in.....	148	168	179	148	163	178	153	170	185	142	168	182	135	164	185
6 ft. 0 in.....	153	173	183	154	169	184	159	174	189	148	173	188	141	171	191
6 ft. 1 in.....	158	178	188	161	175	190	165	180	195	154	179	194	147	177	197
6 ft. 2 in.....	163	183	193	166	181	196	171	186	201	161	186	201	154	184	204
6 ft. 3 in.....	168	188	198	172	187	202	177	192	207	167	192	207	161	191	211
6 ft. 4 in.....	173	193	203	175	192	207	183	198	213	173	198	213	168	198	218

Most Favorable Weight Column—Men

Center column gives best weight; column to left, light weight limit; column to right, the heavy weight limit

Height	Ages 45-49			50-53			54-56			57 and over		
	Light	Best	Heavy	Light	Best	Heavy	Light	Best	Heavy	Light	Best	Heavy
5 ft. 0 in.	94	104	144	90	105	145	90	110	145	90	115	145
5 ft. 1 in.	96	106	146	92	107	147	92	112	147	92	117	147
5 ft. 2 in.	98	108	148	94	109	149	94	114	149	94	119	149
5 ft. 3 in.	101	111	151	97	112	152	97	117	152	97	122	152
5 ft. 4 in.	104	114	154	100	115	155	100	120	155	100	125	155
5 ft. 5 in.	108	118	158	104	119	159	104	124	159	104	129	159
5 ft. 6 in.	112	122	162	108	123	163	108	127	163	108	132	163
5 ft. 7 in.	114	146	171	112	137	172	113	133	173	113	133	173
5 ft. 8 in.	121	151	176	117	142	177	118	138	178	118	138	178
5 ft. 9 in.	126	156	181	122	145	182	123	143	183	123	143	183
5 ft. 10 in.	131	161	186	127	152	187	128	148	188	128	148	188
5 ft. 11 in.	137	162	187	133	153	188	133	148	189	133	148	189
6 ft. 0 in.	143	168	193	139	159	194	139	154	194	139	154	194
6 ft. 1 in.	150	175	200	146	166	201	146	161	201	146	161	201
6 ft. 2 in.	157	182	207	153	173	208	153	168	208	153	168	208
6 ft. 3 in.	164	189	214	160	180	215	160	175	215	160	175	215
6 ft 4 in.	171	196	221	167	187	222	167	182	222	167	182	222

CHAPTER XXXI

WOMEN

THE misogynist, who holds the opinion that women are anomalous creatures, can find much material to confirm his view in the mortality statistics of insurance companies. There is no doubt that women in general live longer than men. The fact that most companies charge more for annuities for women than for men is proof of this statement. Nevertheless, female applicants show a slightly higher mortality as insurance risks than do men, especially at the younger ages. There are several reasons for this. The percentage of women who apply for insurance is relatively small, with the result that there are proportionately more borderline cases. Women, as a rule, have little or no insurable interest. The husband is the breadwinner and the loss of the wife does not curtail the income of the family. Widows, unless engaged in some gainful occupation, have generally a sufficient income to support their minor children, and if they have not, they are not able, for financial reasons, to carry insurance.

Female risks cannot be examined as thoroughly as men, for obvious reasons, nor can the examiner be always sure of the authenticity of the sample of urine. Furthermore, diseases of the pelvic organs cause a considerable proportion of the deaths among female policyholders, and it is often impossible to obtain any clear history of such diseases and, of course, impossible to establish their existence through a physical examination. Finally, women are not as accurate as are men in their statements to the company. This is no doubt due partly to their inexperience in business methods and ethics, their natural disinclination on account of modesty of making a confidant of a strange doctor, and their tendency to view insurance companies as charitable institutions, anxious to pay death claims, where an actual need of such benefits exists in the case of dependent children.

The Medico-Actuarial figures are very interesting. The death-rate among women at ages prior to thirty-five is higher during the first five years that the policy is in force than it is in subsequent years and usually it is highest during the first year. This is the reverse of the experience among men. This can be readily explained on the basis of adverse self-selection against the company.

The experience of the companies was investigated with reference to the conjugal condition at the time of entry, and the results show that spinsters, after the age of twenty-five or thirty, are really better risks than men. Married women gave a high death-rate, particularly where the husband was the beneficiary. The mortality of widows and divorced women is unfavorable before the age of thirty, but after that age the death rate is only slightly less favorable than among men.

The plan of insurance applied for has a well-marked influence. The mortality among those taking endowment insurance was favorable—89 percent; the limited-pay life was 100 percent, while the ordinary life was unfavorable—121 percent. In other words, as is always the case where there is a speculative element and self-selection, the cheaper plans were chosen in preference to the more expensive.

There is very little harmony in the rules of the different companies with respect to women. Some companies do not issue to them at all, while others place practically no restriction, except with reference to large amounts, to writing them for any plan.

The middle course would seem to be the logical one, if the business is to be handled with profit to a company doing only standard business. Most of the companies accept spinsters past the age of thirty, but limit married women, at all ages, to endowment plans. As a rule, widows and divorced women are accepted on life and endowment plans past the age of thirty, after careful investigation and inspection, if they have a well-established insurable interest.

From the agent's standpoint, it is good business policy to ascertain precisely the rules governing the acceptance of women and then adhere to these rules as closely as possible. Medical directors are adverse to making exceptions to their rules regarding women. Women are much more sen-

sitive about being declined or limited than are men. Such action on the part of the company frequently results in the antagonism, not only of the applicant, but of her male relatives, with the result that the agent runs the chance of losing considerable prestige and other good business.

CHAPTER XXXII

RACES OTHER THAN THE WHITE RACE

THE various races living in the United States differ markedly in their mortality rates. There are several reasons why this should be so. A people who have dwelt for centuries in a certain climate are not well-fitted to dwell elsewhere. Medically we know practically nothing of the physiological readjustment known as acclimatisation. It may require many years, or even generations, for its completion. Eskimos, for instance, in spite of the rigors of their own climate, succumb speedily to pneumonia and tuberculosis in the temperate zones, and white residents in India find difficulty in adjusting themselves to the tropics.

Races also show variations with reference to their susceptibility to various diseases. Negroes show a marked resistance to the invasion of yellow fever. Indians readily become victims to measles and tuberculosis. It appears that a disease which has afflicted a race for many generations, eventually loses its virulence for that race.

Finally, the mingling of an inferior stock of people with one mentally superior, is likely to result in the inferior races acquiring most of the vices and few of the virtues of the more advanced people.

The Medico-Actuarial Investigation indicates an excessive mortality for Negroes, Chinese and North American Indians.

Negroes are particularly bad risks at the earlier ages of entry. Even when engaged in the better class of occupations, such as ministry, teaching or in the professions, the death-rate is excessive.

Insurance companies, as a rule, issue to negroes, not because they are desirable risks, but because some states will not permit a discrimination solely on account of race. It is needless to say that they must be selected with great care and caution.

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